Story and Pictures of Michigan Sheet Metal Convention

American Artisan

Founded 1880

The Warm Air Heating and Sheet Metal Journal

Vol. 95, No. 10 CHICAGO, MARCH 10, 1928 $2.00 Per Year

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HORSE HEAD ZINC ROOFING
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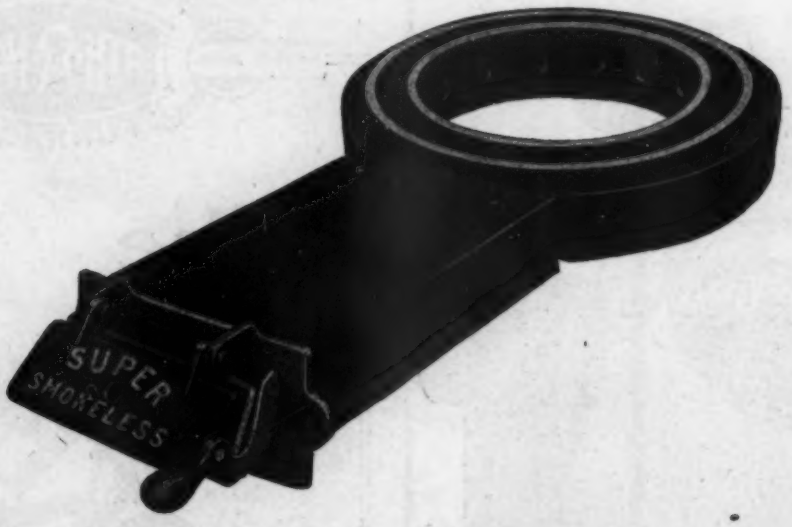

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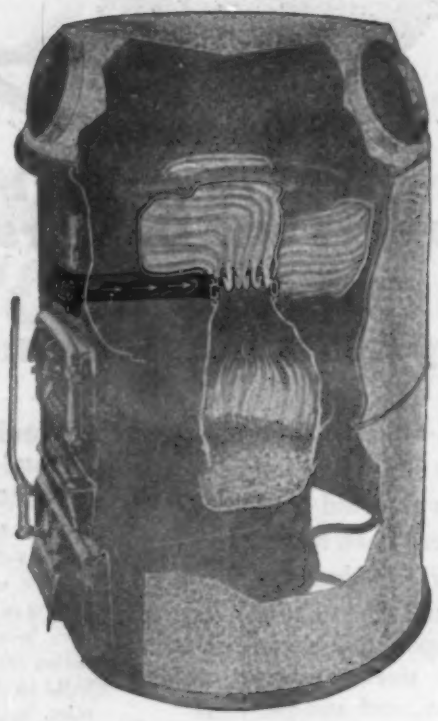

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Write for details today

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HOW does your stock look? How are you fixed for Spring business? Why not check up now and give your stock a thorough going over? Figure your immediate requirements and then add to it a sufficient number of the individual items to take care of any possible demand this Spring.

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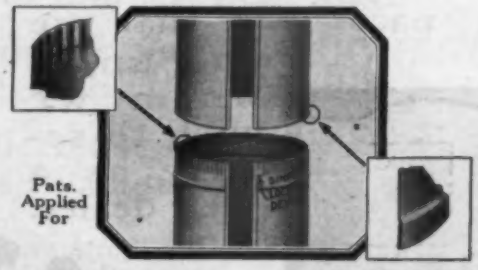
REMEMBER. We have always urged comparison of our products with any other on the market as proof of our claims for LAMNECK products. And now, *Don't Forget* we are giving the new LAMEDGE JIFFY-JOINT feature in addition. This feature, illustrated on the left is standard on all LAMNECK round tin pipe and on the round end of all tin fittings at no increase in price. The W. E. Lamneck Company, 416-432 Dublin Avenue, Columbus, Ohio



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THE W. E. LAMNECK COMPANY, 416-432 Dublin Avenue, Columbus, Ohio.
Gentlemen:
Without obligation, please send me ☐ Catalog ☐ Latest Discount Sheet ☐ Sample_____

*Name*_____ *Address*_____

There always will be price competition—

The only escape is to be above it—

IN every business at all times there is price competition and always will be.

When things look black for you in the warm air heating business and you say "it is impossible for me to sell a furnace job because so and so on the next block is selling furnaces $20 (or $5) less than me" it is time for you to realize that there *is no bottom to price competition* and no profit likewise.

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There are a number of *high quality furnaces* on the market any one of which will so far outclass your price competitors that with your selling of a Standard Code installation—a real heating system—you'll start to get business that would not be entrusted to your price competitor.

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This is substantially how a Weir dealer is obtained, for once he is sold on the idea of *high quality furnaces for high quality warm air heating* he finds in the Weir the furnace that best fits his needs. The more you know about the Weir the more you will appreciate the Weir idea of selling high quality warm air heating.

The Weir Book of Facts which tells all about it is yours for the asking — write for your copy today.

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Peoria-Illinois

Weir

The Original

Steel Furnace

No Friction

when you use

HANDY PIPE

All the angles are curved giving the warm air an easy, even flow

(A FREE SAMPLE ON REQUEST)

The leading pipe for Twenty Years

better now than ever

THE improved HANDY PIPE makes warm air heating installations more satisfactory—quicker on the "pick up"—a more even flow of warm air and less heat loss.

The most practical design and the HIGHEST QUALITY—made of best quality material by UNION MEN in a UNION SHOP.

Because it is made better it serves better—goes together quicker and is in all respects the *Handiest* to use.

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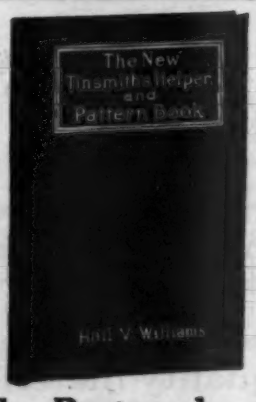
247 Figures

165 Tables



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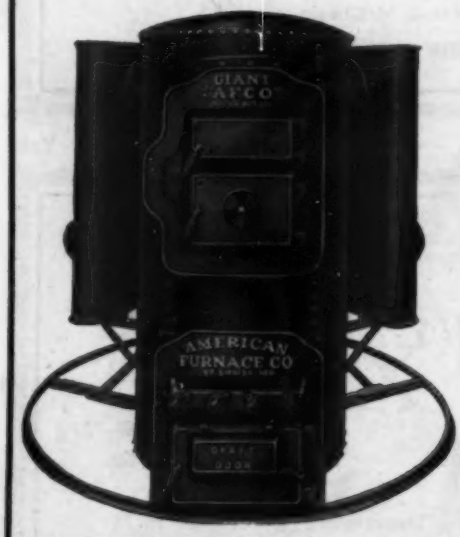
You want the better class of work that pays the biggest profit. It takes good furnaces and good installations to satisfy these particular buyers.

"AFCO" Boiler Plate Furnaces have helped hundreds of dealers like you to win and hold this more profitable business in their respective communities.



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The new 1928 "AFCO" catalogue will soon be ready for distribution. Should we reserve a free copy for you?

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St. Louis, Mo. - - - - U. S. A.

January 9, 1928

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I have one of your cast iron furnaces which has been in use since 1888 and is good yet all excepting the water pan which is rusty and I wish you would send me a new water pan.

Yours truly,
(Signed) Charles D. Eliot,
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Founded 1880

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American Artisan

The Warm Air Heating and Sheet Metal Journal

Yearly Subscription Price:
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Published EVERY SATURDAY at 620 South Michigan Avenue, Chicago

ADVERTISING AND EDITORIAL STAFF

Etta Cohn — Franklin Butler — G. J. Duerr
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Eastern Representatives: M. M. Dwinell, J. S. Lovingham, 156 Fifth Avenue, New York City

Vol. 95, No. 10 — CHICAGO, MARCH 10, 1928 — $2.00 Per Year

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THANKS FOR THE COMPLIMENT, MR. COOPER

205 East Adams St.,
Springfield, Illinois,
February 25, 1928.

To AMERICAN ARTISAN:

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Yours very truly,

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"Manufacturers of fine furnaces for 34 years"

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Here are a few of the many features of the famous No. O. X.: ¶(1) Measures only 8" overall and weighs but 2-5/8 lbs. ¶(2) Can be easily operated with one hand, allowing the other hand to be used for guiding the work. ¶(3) Powerful: Punches 1/4" hole in 14 gauge or equivalent, with ease. ¶(4) Made of drop forged steel, all moving parts of tool steel, individually hardened and tempered, insuring long life. ¶(5) Front pointer and side gauge combination, another exclusive feature of the No. O. X., enables you to punch holes exactly where you want them, many times eliminating center punching. ¶(6) Punches and dies easily and quickly changed by throwing back handle (wrench and screw driver for this operation provided in the side gauge.)

Punches and dies are made in six stock sizes: 1/8", 5/32", 3/16", 7/32", 1/4" and 17/64". Intermediate sizes of round punches and dies can be made to order.

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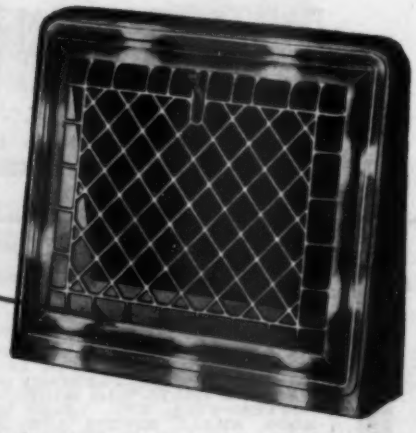

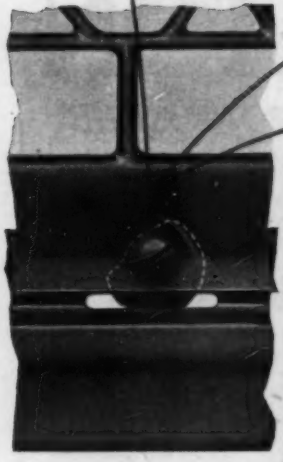

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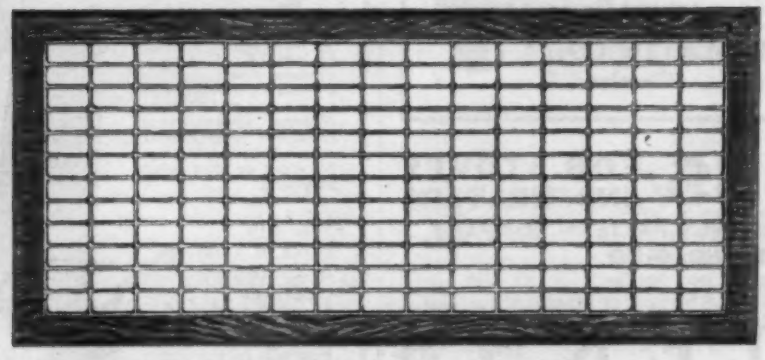

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When writing mention AMERICAN ARTISAN—Thank you!

American Artisan
The Warm Air Heating and Sheet Metal Journal

Vol. 95 CHICAGO, MARCH 10, 1928 No. 10

MICHIGAN STANDARD RAPIDLY INCREASING IN POPULARITY CONVENTIONITES LEARN

By George J. Duerr

Frank Ederle, Secretary

THE Michigan Sheet Metal and Roofing Contractors Association has gone on record as being in favor of a 2-year guarantee on roofing, according to a resolution passed by that body at its seventeenth annual convention held in the New Burdick Hotel, Kalamazoo, Michigan, March 5 to 8, 1928. The fact was also revealed at this meeting that 1927 showed a 57⅔ per cent increase in the amount of Michigan Standard sheets used over 1926.

Another outstanding accomplishment of the association during the year which came to the fore during the convention was the completion of the Standard Roofing Specification. It was presented to the members by A. B. Lewless, chairman of that committee. The committee has been at work on this Standard Roofing Specification for the past six months and they now believe they have something that will go a long way toward bringing about more unity in that phase of the business than has been achieved at any time in the past. Full recognition by the members of the enormous amount of work which the completion of this specification represents, was given the committee by a rising vote of thanks. The final form of the specification will be completed in about two weeks when it will be published in American Artisan.

The Michigan association has a membership of 240 and the greater percentage of those were in attendance at the convention. Homer Brundage on behalf of the Kalamazoo local association welcomed the state members to that city at the opening of the initial session. He was followed by Earl Weber, Secretary of the Chamber of Commerce of Kalamazoo who gave the delegates a cordial greeting.

State President Harry Rhodes in his annual address reviewed some of the more outstanding activities and accomplishments of the association, showing that the Michigan association is the leader in its field in the United States. In this connection Mr. Rhodes also called attention to the splendid work which the Travelers' Auxiliary is doing for the association, and complimented that body very highly on its spirit and accomplishment. Included in the remarks also were words of praise for the splendid cooperation he has had during the year from the various standing committees and individuals who assisted him in making his administration the remarkable success that it was.

Fred R. Bishop, Michigan Stove Company, Detroit, made a very comprehensive presentation of the derivation of the factors which appear in the Standard Code; namely, 12, 60, and 800, and the additional modifications of the factor 60 for wall heat losses. The origin of the multipliers 5, 6 and 9, which appear in the Code, was also explained. It was Mr. Bishop's idea in making this presentation to put the contractors in a position to explain in detail to architects and home owners the standard Code and its basis;

1—C. G. Siebert, Charlie Nason, Bill Laffin and Jay Barton; 2—The Grand Rapids Delegation; 3—Ernest Oberbeck, E. J. Lung and S. M. Rising; 4—Bill Amelung, Bill Sullivan, Bill Busch, A. B. Lewless and Charlie Burnhagen.

thereby taking the sale of warm air heating equipment out of the competitive price class. This address will be found on pages 67 and 68 of this issue.

Mr. Bishop also stated that it is to the advantage of the home owner to board the attic in order to reduce heat losses. The employment of weatherstripping reduces the rapidity of air change in the opinion of Mr. Bishop.

Edwin A. Jones, L. J. Mueller Furnace Company, Milwaukee, addressed the assembly on "Gas Heating the Sheet Metal Dealer's Opportunity." In this address Mr. Jones employed an enlarged photo of a gas furnace in cross-section, and established the fact that to pass the requirement test of the American Gas Association a furnace must be not less than 70 per cent efficient. It must be absolutely tight in construction. Other requirements mentioned by Mr. Jones can be read in the complete address published on pages 74 and 75 of this issue.

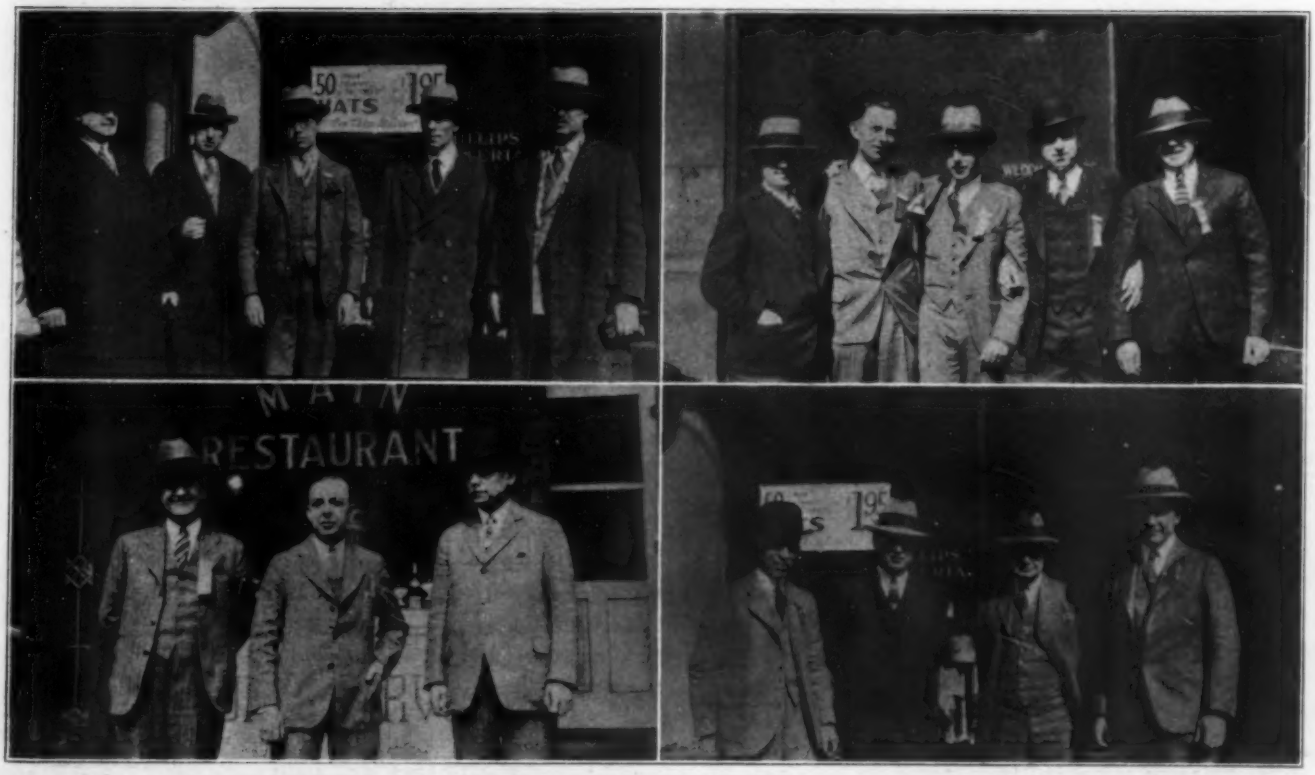
R. W. Menk, Heating Systems Division, Robinson Furnace Company, Chicago, followed Mr. Jones on the program with an informative address on the "Purpose of Boosters on Warm Air Heating Systems." This address is published in full on pages 69 and 70 of this issue. It answers the question, "Why a booster on a gravity warm air heating system"?

In the evening of the first day's meeting the members were the guests of the Kalamazoo local, when a dinner and entertainment were tendered. A mighty fine program had been arranged and all enjoyed it.

Wednesday morning the program included the unusual feature of showing a moving picture of the slate quarries in the east taken by William Busch of Detroit. The movies proved to be very interesting and instructive.

George Steck, special representative of the Central Alloy Steel Corporation, Massilon, Ohio, presented a short address on corrosion-resisting metal. Mr. Steck at the outset mentioned the fact that every year five hundred million dollars are lost, due to the corrosion of metal. He then went on to compare the iron of the present day with that smelted and refined by men of former generations, pointing out why the old time methods produced better results than those of the present. Three things were enumerated by Mr. Steck as responsible for the successful resistance to corrosion which the old time iron offered. These were: the iron was made by skilled artisans; they took their time; the iron had a copper content of from 1 to 1.5 per cent, which united with the iron because of the slow refining process.

Mr. Steck went on to explain that disintegration of iron is caused by electrolysis which occurs when the impurities and gases in the iron ore are not driven off during the refining processes. Surface gases, too, must be disposed of by cropping the molten ingots from 6 to 12 inches from the top. Mr. Steck made the very interesting statement that sheet iron alloyed with copper and molibdenum will resist sulphur and sulphuric acid. This is important in view of the fact that chimney flues connecting with gas-fired furnaces are subjected to sulphurous acid fumes, sulphur being one of the products of combustion of burning gas. An article by Mr. Steck, embodying the principle facts which he presented at Kalamazoo was published in the February 4th



1—Gilbert H. Moore, Fred Bishop, E. B. Root, W. W. Chalk and W. H. Young; 2—A. J. Elbling, J. M. Bvievik, G. A. Wilde, A. K. Anderson and J. A. Ruetty; 3—Homer Brundage, Lee Gillespie and George Steck; 4—Harry Rhodes, Harvey Manny, Marty Armstrong and Art Lamneck.

issue of AMERICAN ARTISAN. It can be read and re-read with a great deal of profit.

A. B. Lewless, Chairman of the Michigan Standard Roofing Specification Committee, presented the completed Standard Specification and was highly complimented for his work and that of the entire committee. This Standard Specification will be published in AMERICAN ARTISAN in a later issue.

Harold B. Allen, Vice President First National Bank and Trust Company, Kalamazoo, spoke on the value of proper bookkeeping methods to any business man. His address was well received. Three items must be kept in mind and made record of in the conduct of any business, according to Mr. Allen. These were the cost of materials, the cost of administration, and the cost of selling. Mr. Allen stated that because of a lack of proper cost accounting and bookkeeping methods there are in this country today 250,000 firms that are not making any profit. These firms have no way of figuring their costs of doing business and no way of proving that their figures represent the true state of affairs in a business, should they, by any chance, get the figures.

Frank Ederle, Secretary of the association, followed Mr. Allen with the joint reports of the secretary and assistant secretary. This joint report follows:

Joint Report of Secretary and Assistant Secretary

"Although business conditions during 1927 were far below normal your association experienced one of the busiest years of its existance. Following a very successful convention at Grand Rapids your officers, directors and committee members started to work on the program which was outlined by the board of directors.

"The first step taken by your secretaries was to obtain a gain in membership. We are pleased to report that a substantial increase resulted. A careful survey convinced us that there were three cities in which local organizations could be formed and as a result associations were formed in Battle Creek, Flint and Detroit. The Battle Creek and Detroit Associations are composed entirely of warm air heating contractors. This gives us two local groups in each of these cities. The Flint local is made up of sheet metal, heating and roofing contractors. It is obvious that with the addition of these three locals that a substantial gain in membership resulted. In addition to this we can say that every local association with the exception of Lansing showed a gain. This increase combined with new members from towns in which no local functions, made a total of 63. From this should be deducted 13 resignations leaving a net gain of 50.

"Michigan Standard sales under the capable leadership of Wm. Sullivan showed a decided increase over 1926. Actual figures are covered in Mr. Sullivan's report.

"On April first, the General Accident, Fire and Life Assurance Corporation took over the compensation insurance of our Association. Fortified with this much larger and stronger company we were able to write ten new policies, most of which were large policy holders and will shop a nice increase in revenue to the association. In addition to this, many fire insurance policies were written. It may be interesting to you to know that commissions

from insurance paid 20 per cent of the total expense of your association. This item can be greatly increased by more co-operation from our members.

"We, being instructed to make a thorough survey of the automobile insurance field, spent considerable time investigating the need and rates of an arrangement on this class of insurance. Questionaires were mailed to you and a sufficient number were returned to us to enable us to arrive at a working plan. This plan will be presented to you at this convention, and we recommend its adoption. It is our opinion that a revenue can be built up to equal that of compensation insurance.

"At the board of directors meeting during the 1927 convention, Mr. H. F. Brundage and your assistant secretary were appointed to investigate and develop some kind of a standard bookkeeping and cost accounting method. Following due consideration a report was made to the board of directors, recommending the employment of a competant firm of accountants and auditors. This report was accepted by the board and the committee instructed to proceed with power to act. Arrangements were then made with Lawrence Scudder & Company and already several of our members have availed themselves of the service. The co-operation received from this firm has been very encouraging, a fact which further convinces us that this movement will soon become the most constructive undertaking ever conceived by our organization.

"You have been informed from time to time through the monthly Bulletin of the activity of the Michigan Standard Built-up Roofing Specification Committee. This committee in charge of A. B. Lewless has probably done more work on this project than the average person can conceive. Many meetings have been held and a thorough investigation made, with the result that the specifications are now complete and will soon be available for distribution.

"We have never had a connection on Michigan Standard Mitres so have entertained a proposition from the Barnes Metal Products Company of Chicago. We recommend its consideration.

"We call to your attention the fact that with the increased activity and size of your organization that it is only natural that the office work increases proportionately. It has taken approximately half of one man's time to perform these duties which of course includes the editing of the Bulletin, Roster and the Program, mailing of circular letters, collection of dues and general correspondence.

"Few complaints have been received of manufacturers or jobbers selling direct to the consumers, but in each case we have given it our immediate attention."

The remainder of the afternoon was taken up by members of the Lawrence Scudder & Company accounting and auditing firm, which the association has employed to assist contractors who desire such service with the estatblishment of adequate bookkeeping systems.

Mr. Rice, one of the company's men, opened the discussion with a description of some of his findings in examining bookkeeping records used. He presented a sheet having the overhead figure used by twelve firms ranging in gross business from $12,000 to $165,000 per year. These overhead figures ranged from 82 to 157. This wide variation in overhead figures used was explained by Mr. Rice as being due to one or more expense items that were out of line. One of the businesses represented had a gross volume of $84,126.21 with an overhead figure of 91.28, which Mr. Rice thought to be about the normal figure. The best distribution of all, however, was a firm having an annual gross business of $165,016 with an overhead figure of 87.97.

Items which make trouble for the contractor are, no proper salary figured for the proprietor, unproductive labor not charged properly, repairs to the shop equipment and the shop itself not taken account of in the overhead, shop supplies charged to overhead rather than to materials, traveling expense not figured in, no provision made for the setting up of a fund to discharge guarantees when called upon to do so.

Methods of billing the customer for work done is another stumbling block upon which sheet metal contractors fall and Mr. Rice showed four methods of billing now in use. Those methods which he presented are given in their numerical order as follows:

No. 1

10 lbs. galvanized iron	$ 1.20
1 pound furnace cement	.20
1 8-inch gal. elbow	.80
4 hours of labor ($1.30 rate)	5.20
Selling price	7.40

No. 2

10 pounds Gal. iron	.60
1 pound furnace cement	.10
1 8-inch elbow	.40
4 hours of labor	3.20
Overhead	3.20
	7.50
Profit 20 per cent	.87
Selling price	$ 9.37

No. 3

94 lbs. Gal. iron	$ 4.70
1 quart of paint	.52
Cost of materials	5.20
25.6 hours of labor	20.28
Overhead	10.24
Factory cost	25.72
Commercial burden — 25 per cent	8.93
Total cost	44.65
Profit 20 per cent	8.93
Selling price	53.58

No. 4

Cost of Materials	$30.00
Labor cost	25.00
Overhead	25.00
	80.00
Profit 20 per cent	
Selling price	

A statement was made by Mr. Rice to the effect that the total cost of installing such a system as the one which they put in would run about $17.00 for the books and

about $105.00 for the installation. Before he had completed he had shown the men present how the entire system is put in, showing the complete records as these are kept, how they are balanced and what they permit their owner to know about his business. The address was very well received.

In the evening the members were the guests of the Travelers' Auxiliary at a banquet and entertainment in the ball room of the hotel. The entire feature was excellent and the Travelers' Auxiliary deserves a great deal of credit for the manner in which the whole thing was done up. Mr. Kelsey of Toledo spoke.

Thursday morning the convention was given over to executive session. The pros and cons of the summer outing were discussed, with the result that it was decided to hold another outing this year. The Committee on arrangements consists of Frank Daly, Al Bersbach, and A. B. Lewless.

The next convention of the Michigan Sheet Metal and Roofing Contractors' Association will be held at Flint, Michigan.

It was decided that the business session at future conventions of the association will be held on the second day of the convention, thus eliminating the Thursday morning session entirely.

The association also decided to purchase a moving picture camera.

Harry Rhodes, in appreciation of his excellent service to the association during his tenure of office as president, was presented with a beautiful Gladstone traveling bag.

Officers for the ensuing year were elected as follows:

President, A. J. Shouldice; Vice President, William Busch; Treasurer, Adam Martin; Secretary, Frank Ederle. Harry Rhodes, Homer Brundage and Fred Sheriff were chosen as directors. A resolution of thanks was voted to the Kalamazoo local and the Kalamazoo Police Department for their effort in entertaining the boys.

First of a Series of Discussions Held by Indianapolis Local

Find Out Who Real Owner of Property Is; an Essential Factor

AT the meeting of the Indianapolis Sheet Metal and Warm Air Heating Contractors' Association, held February 29, the discussion of credits, led by Brant Downey of the Central Lien Company, revealed two facts:

First, that it is essential before approving credit for a construction job to find out in whose name the title of ownership is held, inasmuch as property is bought largely by contract, and the purchaser, while sincere in naming himself as the owner, is not usually the titled owner until all payments are completed.

Secondly, an appeal on the part of a delinquent owner to the contractor not to file a lien on account of friendship is an indication of a lack of friendship on the part of the owner for the contractor; if he were a real friend he would expect the contractor to protect his interests and would want him to do so.

The question box indicated the paramount interest of the membership at this time is in the functioning of the organization and its ability to serve its membership. The question, propounded by Frank Doyle, asking if it were not possible to formulate some plan by which the names of poor paying parties would be placed before the membership to save them some possible loss, was discussed extensively and a tentative plan agreed upon by which such names were to be dropped in the question box to be read in open meeting and filed alphabetically for the future reference of any member interested.

The discussion of the subject of estimating, subhead, overhead, division, "What Does Overhead Include," was read by O. Voorhees, who placed before the meeting as a basis for discussion the following brief:

Rent—Is Overhead, even if the owner of a business is also owner of the building occupied and is one and the same man, that does not alter the fact that there is rent charge. Because the building is worth its rental price, no matter though the owner uses it himself. Rent is overhead in every business.

Salary is overhead in every business, even where the owner and manager is one and the same person, even though he is also the mechanic and has no employees, the business must still pay that man a salary.

Otherwise he could live only when working, and not live through dull weeks and possibly months. Or could not live when he works hard all week trying to close a deal or deals for roofing or spouting, or furnaces. Though his salary need be only large enough to pay him for the time actually spent in such effort at selling, it must be paid—and management or sales efforts must be paid in order to maintain the business—And the manager's salary is Overhead.

Estimating and Selling, as well as Accounting and Collecting are Overhead.

Delivery Equipment, and its upkeep are Overhead. Office and Shipping Equipment, and their upkeep are Overhead. Heat, Light, Water and Telephone are all Overhead. Advertising and Publicity and Postage are all Overhead.

Insurance — Fire, Automobile, Liability and Compensation are all Overhead.

Interest on Investment and Taxes are Overhead.

Lost Time—When nothing is being done, this is Overhead and must be made up during the time of actual employment in sales and installations of work directly chargeable to somebody.

Bradford Snodgrass called attention to the fact that collection losses must also be figured as overhead, as

well as ways and costs of collecting bad accounts.

Harry Peterson called attention to the fact that the time of the owner in the evening, and at odd times, should be figured as well as all of the time spent by himself during working hours, and should be classed as overhead, unless he is working on production.

J. F. Richwine explained how he had been forced to adopt a double entry system of bookkeeping when he incorporated his business, but said that he believed all of the time spent in the keeping of books correctly was well spent and that every sheet metal contractor, no matter how small, should keep a complete and accurate set of books. The bookkeeping itself is an Overhead item, but pays for itself in showing the contractor what his overhead is, as well as what his other costs are, and just how his business stands.

A definition of overhead given was, "Everything not chargeable to any one job must be charged to overhead." The definition was accepted as correct, but as relatively unimportant inasmuch as the vital question is as to just what items are to be included in overhead, and having determined that, to see that no item is missed and that overhead is always figured.

President Homer Selch of the Indianapolis local organization and President W. S. Waters of the State organization were both in attendance at the meeting and reported a wide spread interest in, and support of, the constructive program inaugurated by the local organization.

Barnes Zinc Changes Name to Barnes Metal Products Company

Formal announcement of the change in name of the Barnes Zinc Products Company to the Barnes Metal Products Company, 1531 Kingsbury Street, Chicago, has been made by C. G. Siebert, Manager of the company.

This change in name was regarded as desirable due to the fact that the company fabricates conductor pipe, eaves trough and the complete line of fittings in all metals, and for that reason the change from "zinc" to "metal" more clearly describes the company's activities.

Kalamazoo Blow Pipe Co., Kalamazoo, Michigan, Changes Name

The Kalamazoo Blow Pipe Company, 408 North Church Street, Kalamazoo, Michigan, has changed its name to the Brundage Company. Homer F. Brundage, past president of the Michigan Sheet Metal and Roofing Contractors' Association, is president of this company.

Third Sheet Metal Short Course at Iowa State College, Ames, March 14-15-16, 1928

In cooperation with the Iowa Sheet Metal Contractors' Association, the third sheet metal short course will be conducted at Iowa State College, March 14, 15 and 16, 1928.

Wednesday, March 14

Forenoon — Registration, Room 105, Engineering Hall. Sessions Room 207, Engineering Hall.

1:30 p. m.—Address by J. V. Edling, President Iowa Association of Sheet Metal contractors. Are You Needed?, by W. C. Markle, Secretary National Association Sheet Metal Contractors. Electric Fans in Warm Air Heating, by J. C. Miles, Vice-President The Warm Air Furnace Fan Company. Fan Installations, by Walter Grissell, President Grissell Cornice Company.

Thursday, March 15

9:00 a. m. — Opportunity, by Harry S. Rogers, Director Sales and Promotion, Sheet Steel Trade Extension Committee.

Research Work in Farm Building Ventilation, by Henry Giese, Agricultural Engineer Dept., Iowa State College. Inspection of Mechanical Engineering Shops.

1:30 p. m.—Results of Research Work in Warm Air Heating, by A. P. Kratz, Research Professor, Mechanical Engineer, University of Illinois. Discussion and Question Box.

Friday, March 16

9:00 a. m.—Ventilation of Hog Houses and Farm Buildings, by N. A. Lichty, Lichty Ventilating Company. Gas Heating, by E. A. Jones, The Mueller Furnace Company. Motion Pictures, The Production and Manufacture of Copper, The Baltimore Copper Mills.

There are no fees in connection with this course and anyone interested in sheet metal work is invited to attend.

Engineering Extension Department,
Iowa State College.

Chicago Sheet Metal Employers Order and Pay for 300 Trade Development Books

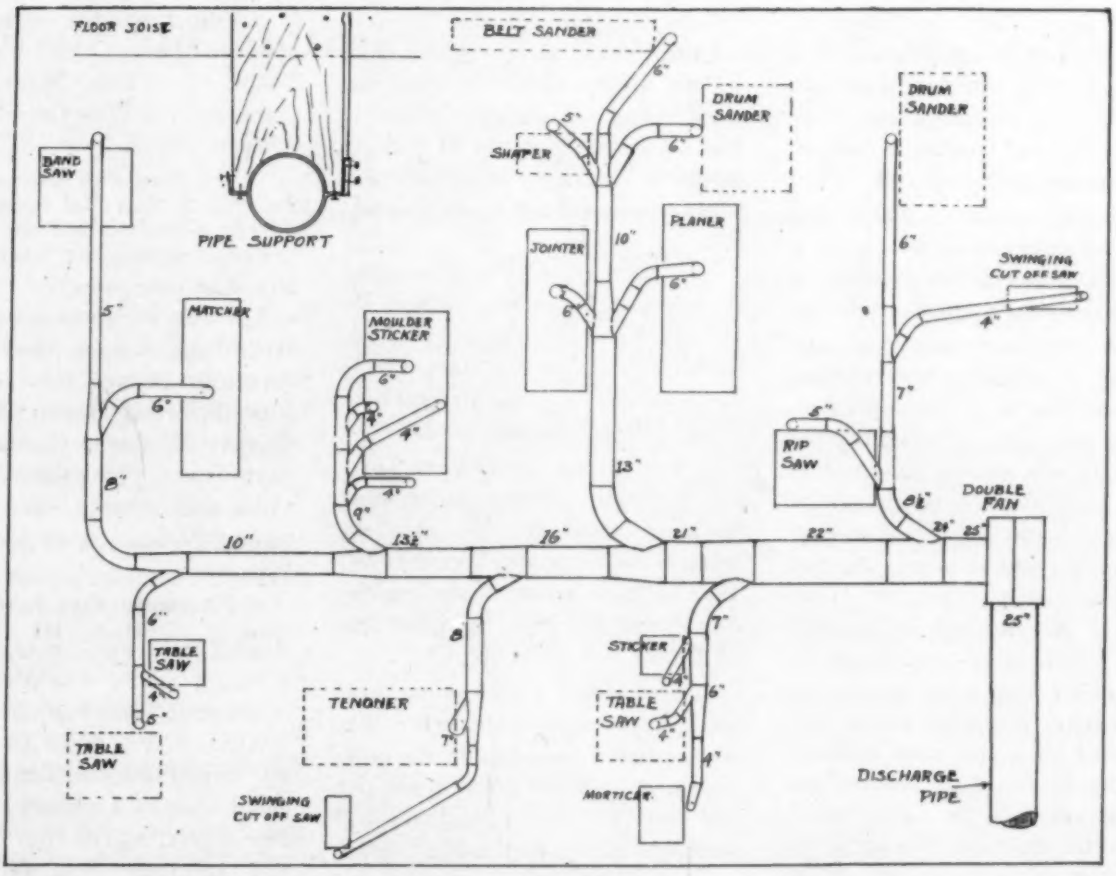
The Associated Sheet Metal Employers of Chicago, whose president is H. J. Dettmers, has already ordered a total of three hundred Trade Development books and have paid the National Association of Sheet Metal Contractors $3,000 or the total amount for these books.

"This is by far the largest order we have received," said George Harms, under whose direction the book is being produced, "and the only one which is paid for in full. Similar action by other locals and individuals would be very much appreciated."

This action on the part of the Associated Sheet Metal Employers of Chicago should be an inspiration to state associations and other locals, as well as individuals, to get behind the national association in the way of supporting the venture.

Herbert Hoover Presented with Lawrence Saunders Medal

At a recent dinner held in honor of Secretary of Commerce of the United States Herbert Hoover, the American Institute of Mining with the Laurence Saunders medal Engineers presented Mr. Hoover for proficiency in mine engineering. The presentation was made by Cornelius S. Kelley, President of the Anaconda Copper Mining Company. The proceedings of the dinner were broadcast.



Blow Pipe Design

Trunk Line and Branch Design on a Blow Pipe Dust Removing System

Diagram Shows Several Different Blow Pipe Designs Flowing Into Main Trunk Lines

By O. W. Kothe, Principal St. Louis Technical Institute

SOME time ago one of our friends sent in the accompanying drawing, which we think is very good for a blow pipe job. It gives a good variety of machines and shows a good run of piping. Just who was the interested party in sending in the design I have forgotten, but the reader will see that considerable work has been put on it and knows that it takes training to put such jobs on paper. In this job we have a number of different types of saws, also moulders or stickers, matchers, planers, jointers, shapers, as well as drum sanders. Each machine requires its own type of hood, and a special study is often necessary to determine the way it will operate best.

One of the things workmen must observe is to keep the pipe out of the factory or machine operator's way. That is another element that enters into the design of the system. It is much like any farmer mechanic can install a warm air furnace and fill the basement full of pipes so it is not of much use for anything else; but it takes a man with geometrical training and understanding to group and organize his piping systems so the minimum space is used. With blow piping we have the same problems, only that if piping get in the way they are soon knocked down or crushed so that a workman must be sent on the job to fix it again.

Here in this design we show the pipe sizes used for the different machines which is standard practice, and altogether it requires a fan with an inlet of some 25 inches diameter that is necessary. From this size the fan can easily be selected, taking in the horsepower as well as other engineering data from manufacturers' catalogs. Many men feel they have to know how to figure the speed of a fan and its air delivery as well as its pulling power and such many other things, which are entirely impractical. This is not so important an item since fans are rated by manufacturers' tests rather than by any formula of calculation. The larger idea is to design the piping system and know how much air you need at each of the machines,

the air being rated in inches of water in a U-shaped gage glass. According to this different materials need different pressures, and it is here where the trouble comes in with most inexperienced folks.

Ordinarily speaking, the system should be designed so as 3½ to 4 inches of water is displaced in a gage glass by the suction of the fan.

From an observation of our drawing, it is evident that nothing is shown that is very complicated, and the main item is straight pipes with some elbows and tees, and of course each machine requires wind gates which can be of a manufactured article and is merely inserted in between the pipe lengths. Then there is the method of making hoods, which is of considerable interest in knowing what hoods must be stationary and what hoods must be placed on a slip joint basis, so they can be raised or lowered and what hoods must be made removable, so the machinist can get at the knife blades for repairs when needed. Other points that enter are the hanging of the pipe, which is usually done by enlarged detail shown at top of drawing. Where fireproof construction is required this same sort of pipe support is made out of metal with edges bent over and a metal strip bent around and bolted into position. These hangers are anchored to the floors or beams or other construction which will make a rigid connection. It is evident that where many machines are humming with their pulleys and belting connections, as well as delivery and discharge trucks, the piping system must be put up to stay.

Gilbert Moore Becomes President of Michigan Travelers' Auxiliary

The annual meeting of the Michigan Travelers' Auxiliary was held in the New Burdick Hotel, Kalamazoo, Michigan, Wednesday morning, March 7, 1928, with President E. B. Root in the chair.

A greeting from R. W. Blanchard, who is at the present time in Los Angeles, California, was received and read.

Fred Bishop who constituted the membership committee reported. The association now has 99 paid up members. It is easy to see why the Michigan association is so successful.

The election of officers resulted as follows: President, Gilbert H. Moore; Vice President, Frederick Richard Bishop; Secretary-Treasurer, W. W. Chalk; Sergeant-at-Arms, "Brigg" Young.

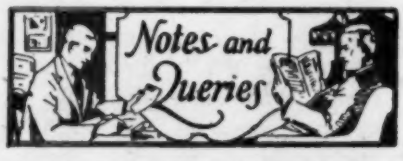
J. F. Johnson, AMERICAN ARTISAN, moved that the association show its appreciation for the excellent services the Secretary-Treasurer W. W. Chalk has rendered the association during the year. A rising vote of thanks was given Mr. Chalk.

Gilbert Moore, the incoming president, acknowledged the honor that was bestowed upon him by the association in his usual graceful manner and asked for the cooperation of all members during the coming year.

Fred Bishop, the incoming vice president, pledged his wholehearted allegiance to the organization.

A letter of condolence was voted to be sent to the family of Joe Behler who died recently.

One Travelers' Auxiliary member who was not present at the meeting was Travers Daniel, Jr., Grand Rapids. But Mr. Daniel had a good and sufficient reason for not being there. The Sunday evening previous to the meeting he was struck by a hit-and-run motorist and is now flat on his back in bed. He was badly scratched about the face and arms and both ankle bones were broken. So it will be a long time before he will again be able to get out to see the trade. His address is 817 Merritt Street, S. E., Grand Rapids.



Phomene Type Fire Extinguisher

From L. B. Sanford and Company, Atwater, Ohio.

Please inform us where we can obtain an automatic fire extinguisher to put on a pipe line with a water pressure system.

Ans.—Pyrene Manufacturing Company, 444 West Grand Avenue, Chicago, Illinois.

Blow Pipe Gates

From C. B. Rose, 322 South Carolina Street, Louisiana, Missouri.

Please inform me where I can buy blow pipe gates and supplies.

Ans.—B. F. Sturtevant Company, Hyde Park, Boston, Massachusetts; American Blower Company, 6004 Russell Street, Detroit, Michigan; Berger Brothers Company, 227 Arch Street, Philadelphia, Pennsylvania, and Alfred C. Goethel Company, 829 31st Street, Milwaukee, Wisconsin.

Ornamental Yard Fountains

From J. G. Hugo, 148 East Grove Street, West Point, Nebraska.

Kindly advise who manufactures ornamental yard fountains.

Ans.—J. W. Fiske Iron Works, 107 Park Place, and Pompeian Garden Furniture Company, 448 West 38th Street, both of New York City, and Hinderers Iron Works, 1607 Prytania Street, New Orleans, Louisiana.

Repairs for Cascade Washer

From M. Gensmer and Son, Caledonia, Minnesota.

Please advise where we can get repairs for a Cascade hand washing machine.

Ans.—H. M. Sheer Company, 2nd and Hampshire Streets, Quincy, Illinois.

Rolls for Anchor Brand Wringer

From Riverside Hardware Company, 2017 Riverside Boulevard, Siou City, Iowa.

Please advise where we can get a pair of new rolls for Anchor Brand wringer No. Z52S Model X 4.

Ans.—Lovell Manufacturing Company, 180 North Wacker Drive, Chicago, Illinois.

All Copper, Centrifugal Type, Electric Washer

From Milton L. Kistler, Alexander City, Alabama.

Please inform me who manufactures electric washing machines, all copper, using the centrifugal motion for drying the clothes.

Ans.—Syracuse Washing Machine Corporation, Syracuse, New York, and Savage Arm Corporation, Utica, New York.

Explaining Source of Factors Found in Standard Furnace Code

With Idea to Help Furnace Installers Better to Understand Code

By Fred R. Bishop*

THE following forms the basis of an explanation of how the Standard Code factors are arrived at, placing the furnace installer in a better position to work with the Standard Code:

Article No. 3, Sections 1 to 3

Why 800? To heat 1 cubic foot of air 1 degree requires .018 b.t.u.

To heat same 70 degrees—.018×70=1.26.

The Standard Code reduces all calculations to thousands of b.t.u.'s. 1,000÷1.26=800. In other words, 1,000 b.t.u. will take care of 800 cubic feet of air.

Example: 2,400 cubic feet ÷ 800 =3 or 3,000 b.t.u. Same as 2,400×1.26=3,024 b.t.u.

Why 12? To heat 1 square foot of glass surface 1 degree requires 1.18* b.t.u.

To heat same 70 degrees—1.18×70=82.6 b.t.u. 1,000÷83=12. In other words, 1,000 b.t.u. will take care of 12 square feet of glass.

Example: 60 square feet of glass ÷12=5 or 5,000 b.t.u. Same as —60×82.6=4,956 b.t.u.

Why 60? To heat 1 square foot of No. 1 wall surface shown in Table A 1 degree requires .23 b.t.u.

To heat same 70 degrees—.23×70=16.1 b.t.u. 1,000÷16.1=62. The factor 60 has been used for easy figuring.

Example: 240÷60=4 or 4,000 b.t.u. 240÷62=3.87 or 3,870 b.t.u. Same as 240×16.1=3,864 b.t.u.

As explained in Table A, the wall factor is variable on account of different constructions of walls.

Detailing some of the factors in Table A, we have the following:

No. 3—9″ brick wall (no plaster), heat loss through 1 square foot is .36 b.t.u. per degree.

$$\frac{1{,}000}{.36\times70}=40$$

No. 4—9″ brick wall plastered one side, heat loss per degree = .30 b.t.u.

$$\frac{1{,}000}{.30\times70}=48$$

No. 5—9″ brick wall, furred and lathed and plastered one side = .22 b.t.u.

$$\frac{1{,}000}{.22\times70}=65$$

No. 6—13″ brick wall (no plaster) = .27 b.t.u.

$$\frac{1{,}000}{.27\times70}=53$$

No. 7—13″ brick wall, plastered one side = .25 b.t.u.

$$\frac{1{,}000}{.25\times70}=57$$

No. 8—13″ brick wall, furred, lathed and plastered = .19 b.t.u.

$$\frac{1{,}000}{.19\times70}=75$$

No. 9—4″ brick, 4-inch hollow tile, plastered = .26

$$\frac{1{,}000}{.26\times70}=55$$

No. 10—Brick veneer = .21.

$$\frac{1{,}000}{.21\times70}=68$$

No. 12—8″ hollow tile, stucco, furred, lathed and plastered = .16.

$$\frac{1{,}000}{.16\times70}=90$$

12″ stone wall, furred, lathed and plastered = .39.

$$\frac{1{,}000}{.39\times70}=37$$

In the average attic, when it is zero outside, the temperature in the attic is about 35 degrees.

Ceilings consisting of joists and lathed and plastered = .60.

$$\frac{1{,}000}{.60\times35}=50$$

Ceilings as above with tight 1-inch floor above = .32.

$$\frac{1{,}000}{.32\times35}=90$$

Be sure to include a separate item as above for ceilings in one-story buildings; also ceilings on top floors of buildings higher than one story, in which case ceilings in lower floors not included when upper floors are heated.

4-inch concrete on ground .31.

Assume temperature of floor 50 degrees. 70—50=20 degrees.

$$\frac{1{,}000}{.31\times20}=161$$

1-inch wood floor, paper and 1-inch flooring with space under = .21.

Assume temperature of 35 degrees in space if boarded around.

$$\frac{1{,}000}{.21\times35}=136$$

Same if exposed to weather—

$$\frac{1{,}000}{.21\times70}=70$$

No. 13—1″ board, tar and gravel = .30, same as No. 4.

No. 14—1″ board, composition roofing = .36, same as No. 3.

Why 9, 6 and 5?

At 175 degrees register temperature, with return air at 65 degrees, which are standard temperatures, every square inch of warm air pipe not over 12 feet long, with one elbow and one angle, will give off to the rooms heated as follows:

First floor, per square inch pipe area—105 b.t.u.

Second floor, per square inch pipe area—170 b.t.u.

Third floor, per square inch pipe area—200 b.t.u.

Changing these figures to thousands, we have:

1,000÷105=9. In other words, 9 square inches pipe will deliver 1,000 b.t.u.

*Address delivered by Fred R. Bishop, Manager Furnace Department, Michigan Stove Company, Detroit, at the convention of the Michigan Sheet Metal & Roofing Contractors' Association, Kalamazoo, Michigan, March 5 to 8, 1928.

1,000÷170=6. In other words, 6 square inches pipe will deliver 1,000 b.t.u.

1,000÷200=5. In other words, 5 square inches pipe will deliver 1,000 b.t.u.

Why "105"?

Temperature air entering room ..... 175 deg.
Temperature air leaving room ..... 65 deg.

Degrees heat left in room 110

Velocity air in leader to first floor, 126 feet per minute.

1 cubic foot requires for 1 degree, .018 b.t.u.

Formula per hour:

$$\frac{126\times.018\times110\times60}{144}$$

Equals 104 b.t.u. or 105 — even figures.

60 — to change minutes to hours.

144 — one square inch equals 1/144 of a square foot.

Why "170"?

Velocity air in leader to second floor—204 feet per minute. Other data same as first floor.

Formula:

$$\frac{204\times.018\times110\times60}{144}$$

Equals 168 b.t.u. or 170—even figures.

Why "200"?

Velocity air in leader to third floor—240 feet per minute.

Formula:

$$\frac{240\times.018\times110\times60}{144}$$

Equals 198 b.t.u. or 200 for even figures.

Article 3, Note 6—Additions for directions:

While the Code calls for certain directions additions, these vary with different localities on account of local conditions.

Note—All heat loss requirements in Code are based on 15 miles per hour wind. This is equal to 15 below zero in still air.

Note—For first floor, full area of basement pipe calculation to be carried through to register, which means that if room calls for 30 square inches pipe area and an 8-inch pipe is used, then a 30 square inch stack may be used. In no case should side wall registers be used where basement pipe area calculation is greater in area than stack.

Note 8, Article 3—Extra long basement pipes and extra elbows. Square inch area to be added to calculated basement pipe size over 12 feet long.

Diameter of pipe, inches	8	9	10	12	14
For every 5-ft. added length	4	5	6	9	12
If one extra angle	5	6	7	10	13
If one extra elbow	10	12	14	20	26

Note—Areas of crossovers in wall stacks should equal basement pipe sizes.

Article 3, Section 9—

$L=1.75\ G\ (1+0.02\ (R-20))$

L=Leader pipe area.

G=Grate area in square inches.

R=Ratio of heating surface to grate area.

$$1.75=\frac{C\times G\times F\times E\times.75}{136\times144}$$

G=Grate area in inches.

C=Pounds coal per square foot grate per hour=7½ pounds.

F=Value of coal per pound in b.t.u.'s=12,790 b.t.u.

E=Efficiency of furnace—top radiator type at 20 square feet heating.

Surface per square foot grate at 7½ pounds per hour=55 per cent.

.75=75 per cent of total B.t.u. available at bonnet—to offset basement loss.

$$\frac{G\times7\frac{1}{2}\times12{,}790\times55\times.75}{136\times144}=2G$$

2 G has been reduced to 1.75 G as factor of safety.

Example: "A" furnace. Grate area—254. Heating surface, 22.7. 22.7—20=2.7. 2.7×.02=.054. .054 +1=1.054. 1.75×254×1.054=469 square inches.

Death Claims Albert G. Scherer of Excelsior Steel Furnace Co.

Albert G. Scherer, 5723 Race Avenue, passed away on February 28, 1928 at the Presbyterian Hospital, Chicago, after a short illness. Born in Stoughton, Wisconsin, August, 1861, Mr. Scherer was not quite 67 years old. He leaves to mourn his passing, his wife, Agnes Scherer, one brother, Frank, of Litchfield, Minnesota, and one sister, Mrs. Ed. Hafemeister of Milwaukee, Wis. His parents lived and died some years ago in Milwaukee, Wisconsin. The funeral was held Thursday afternoon at two o'clock, burial being made in Memorial Park cemetery.

Mr. and Mrs. Scherer had returned but one week prior to Mr. Scherer's death from a vacation in Florida. His death being so sudden came as a distinct shock to all.

Mr. Scherer began work as a mechanic with the Excelsior Steel Furnace Company, Chicago, nearly forty years ago and rose steadily in position until he became a foreman, then superintendent and finally vice president. He possessed talent of a high order and soon demonstrated inventive ability which was employed in the designing and building of numerous machines for the production of goods in the heating line. Many patents on both goods and machines were granted to him by the government and transferred to the company. He devoted his time and knowledge to the production of heating specialties which are recognized as leaders in the market.

Albert G. Scherer

Mr. Scherer was not only a successful manufacturer, engineer and inventor but a man of excellent business judgment and his death is a distinct loss to the heating industry.

Why Is a Booster Necessary on Gravity Warm Air Heating System?

Requirements Thoroughly Studied Before Type of Fan Is Determined

By R. W. Menk*

I AM to talk to you today on the subject, "The purpose of Boosters on Warm Air Installation." This seems to be a subject of considerable interest just now, and I grant you it is.

Much has been said and much has been tried in the way of application of fans and blowers to warm air furnaces. The fans and blowers under dealers' benches and the fans that are installed that are either not giving the anticipated results or are unsatisfactory in one way or another, are sufficient evidence of a need for a greater knowledge of their application. Article after article in the trade journals in past months is a further indication of this need for determining the kind of application to make on a *particular kind of job*. Even large fan and blower manufacturers have been puzzled on the subject, because of the frequent failures to produce the anticipated results. Often-times, what worked satisfactorily on one installation would be a complete failure on another. The money that has been wasted and the experimenting that has been done, often at the expense of the dealer, is deplorable. We have had ours, you can bet, particularly because of the varied furnace designs, casing areas, and installation conditions. The fellow who thinks he can attach any old fan or pinwheel to a furnace and make it percolate just as he wants, is in for more grief than profits.

Classes of Systems

What I am trying to tell you is, before you spend money experimenting, be sure that you know what kind of equipment is best fited for the job. I do not mean by that that you should not continue to apply fans to furnaces, but satisfy yourself that you are not going further than your knowledge will permit. Better submit the job to your fan manufacturer, who will then share the responsibility with you.

In that way you and all will profit by the good that can be done for warm air heating. The good name that warm air heating is building for itself should not be destroyed by applying fans or boosters thoughtlessly.

Let us consider the good we can do for warm air heating with fans and blowers; let us consider what we can do to raise its standard, and also what the possibilities are for better profits.

Many Systems Handicapped

I venture to say that 75 per cent of the larger installations are handicapped in one way or another. More often this condition is caused through building design. The fact that it is hard to heat does not necessarily justify an alteration in building design in order to heat it. A partition, a beam, or a chimney may often make it difficult to make such an installation as one would wish.

I assume that the majority of you have noted the tests that have been made at the research residence at the University of Illinois in past years. I do not know how carefully you have analyzed the data as to temperatures that existed between floors and ceilings in the various rooms. Differences of ten or more degrees between floors and ceilings are uncalled for in this modern age. If 70° is a comfortable room temperature, then 64° on the floor is unfit for our babies to play in, and 80° at the ceiling is transmitting a wasteful amount of heat at a point where it does very little good.

This condition is, of course, equally true in many instances with other kinds of heating, but it should be generally corrected in order that more uniform temperatures exist. Then again, who can control the wind and cause it to always blow in a particular direction? These features alone should warrant your attention.

Every heating system relies upon air circulation to perform its proper function, and the capacity of the system depends upon the number of heat units that the heater can produce and the plant's ability to deliver them in the most economical and satisfactory manner to the spaces to be heated. But the air movement is the principal factor in determining the results, and as a consequence, is of vital importance.

Volumes, Heat Pickup and Static Air Pressure

These are three fundamental principles involved. One is a matter of volume, the other a matter of heat pick-up, and the third a factor of static pressure or resistance in the ducts and at the registers. It depends entirely upon what the system is to be used for. I believe everyone will agree that the principles contained in the Standard Code are as nearly correct as experience and calculations can determine. If a furnace is installed accordingly, atmosphere, temperature, air circulation all go to make up that ideal, comfortable heating effect so outstanding among the types of heating systems that are in use today.

Here are some of the questions that have been raised. "What more do you want than a good gravity

*Address by R. W. Menk, Heating Systems Division of the Robinson Furnace Company, Chicago, before the members of the Michigan Sheet Metal and Roofing Contractors' Association in convention at Kalamazoo, Michigan, March 5, 6, 7 and 8, 1928.

job?" "Do we need more air volume?" some say. "Of course not, for the system installed by the Standard Code gives volume enough," others say. "More air volume will create drafts and air currents that are objectionable," another says. "More air volume means added cost to move the air." "More air volume will tend to reduce air temperature, in some instances too much, but will equalize the warm temperature." And so it goes in the matter of volume.

Then another says, "For goodness sakes, what can a fan do for a furnace?"

A fan or blower can help produce the best results that a warm air furnace can give—ideal results that every warm air furnace is supposed to give. During recent months some definite conclusions have been reached, some outstanding principles have been worked out showing that it's only a question of applying what is required.

Blowing or forcing air through a standard portable furnace casing, whether the air is delivered to the casing direct or by way of cold air ducts can produce only results as indicated above, more volume, lower register temperature, more uniform temperature between floor and ceiling, more drafts, etc., if the fan has more capacity than the natural gravity capacity.

What Is Capacity of Furnace

The capacity of a warm air furnace is more than double its gravity capacity. That's one of the reasons furnaces get (red or white) hot and burn up. In analyzing the situation, there was only one conclusion, that the best results that a warm air furnace can give are achieved, then it is not a question on the average job or more air, but more heat pick-up, and the large number of installations made in recent months have demonstrated the fact to dealers and home owners beyond question.

A booster is necessary to overcome the resistance through the plant, for the slight difference in weight between the warm and cold air necessitates the overheating of the furnace whenever the weather conditions are severe. The booster is necessary to produce that quick pick-up in the morning after the house has been allowed to cool during the night. The booster is necessary to drive the heat to the extreme corners of the building without having to *create severe heat,* not a *cyclone through the system* or a *gale throughout the house,* but that ideal *June-like atmosphere* that only *warm air can supply.* The booster will save fuel, it will deliver the heat to every nook and corner for much less money than by the process of overheating the furnace. The booster is necessary to overcome the unbalanced conditions that exist, to some extent, in even the very best installations.

Let us cite some concrete examples, and perhaps it would be logical to apply them to the research house at the University of Illinois, as you are all more or less familiar with it. This will enable you to visualize what is to follow. Here are some of the data evolved from the reports that will be of interest in working out the need for a booster.

Cubical contents 17,000 cu. ft.

Warm air pipe area 832 sq. in.

$$\frac{832}{144} = 6 \text{ sq. ft.}$$

Cold air pipe area 854 sq. in.

Building heat loss 132,370 B.t.u.

Zero Weather:

Recirculated air changes 3-47,500 C. F. H.

135° register temperature, over 5 lb. combustion rate.

Volume air moved per minute

$$\frac{47{,}500}{60} = 800 \text{ C. F. M.}$$

Mild Weather:

Recirculated air changes 1.5 25,000 C. F. H.

105° register temperature 1.5 combustion rate.

Volume air moved per minute

$$\frac{25{,}000}{60} = 417 \text{ C. F. M.}$$

Average B.t.u. per inch pipe area

$$\frac{132{,}370}{832} = 160 \text{ B.t.u. per inch.}$$

B.t.u. per minute

$$\frac{132{,}370}{60} = 2{,}206 \text{ B.t.u. per minute.}$$

Volume air through plant

$$\frac{800}{6} = 133 \text{ C.F.V. per minute.}$$

Now, if you will take note of these figures, you will see that we have a building containing approximately 17,000 cubic feet of space. First, I want to call your attention to this volume of air as weight—$17{,}000 \times .075 = 1275\#$ at 70°. It does not make any difference whether you move that amount of air, pig iron, feathers, or whatnot. Any slight attempt at moving this volume of air must affect the entire load. There isn't a man in this room who can even push a ball of that weight one inch.

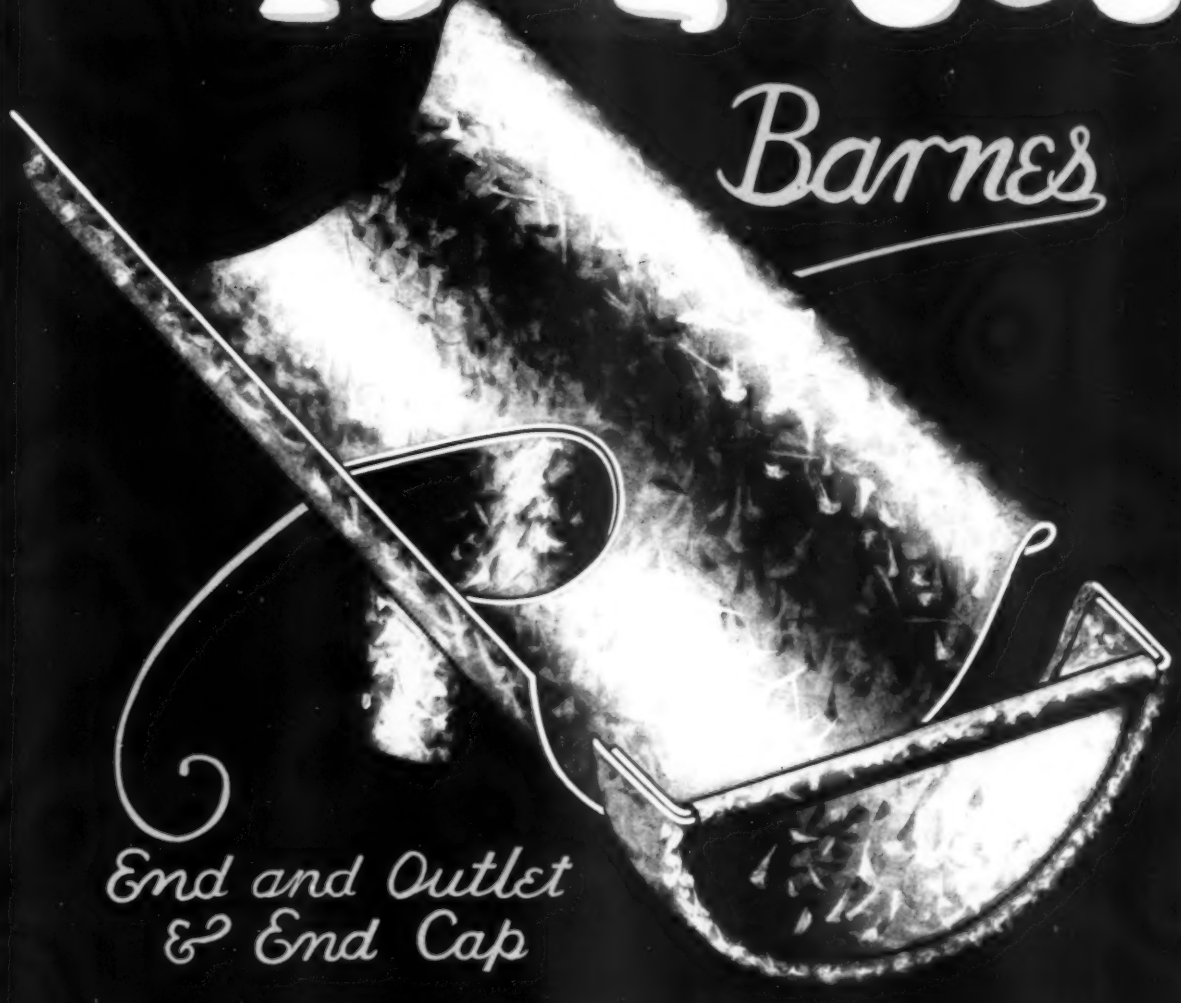
Now, let us consider that we move three times that much air per hour. We then have 3,825# to move per hour. That means 62# a minute, and regardless of what physicists say, it requires that much heat energy to move that amount of air. The heat must be put into it. Then consider that a building temperature falls to 40° and it takes three hours to raise the temperature to 70°.

We then have an average weight very much higher and, consequently, the heat energy required to move it will be proportionate. I am alluding to such buildings as churches and schools. During these periods, the average furnace is being wrecked by overheating and the fuel waste is shameful, because we, as heating men, have not been willing to get out of the paths of least resistance. There has, of course, been an awakening, but if warm air is to keep pace with progress in other industries, we must foster every good move that will tend to reduce heating costs.

There are many ways to move this air. You can drive a given

Undenied Progress

Barnes



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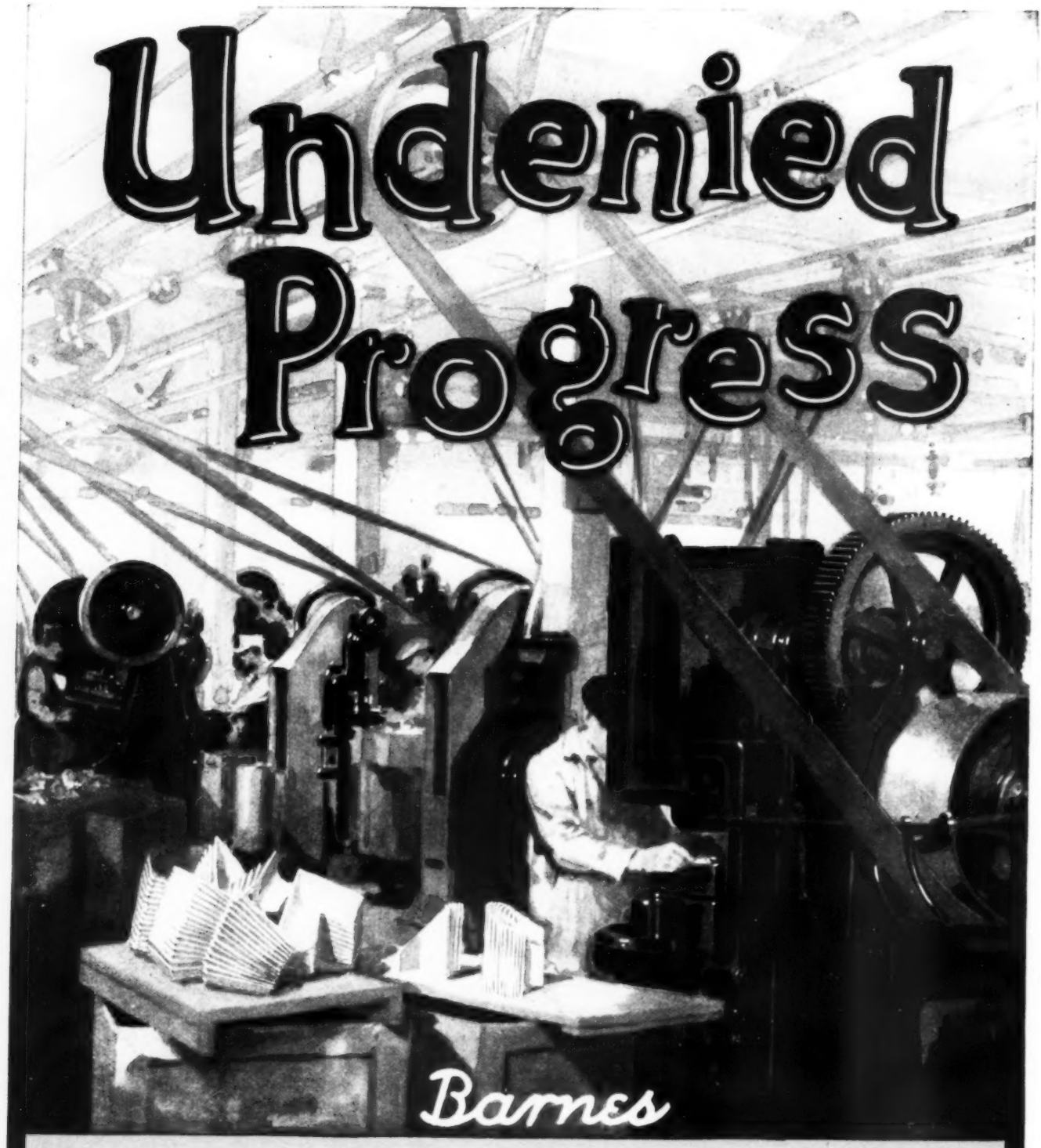

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volume through a housing and proportionately increase the B. t. u. delivery into the building, but don't forget that the more air you move the more money it costs in electrical energy to move it. One can move such a volume and still warm the building as to require more in electrical energy than the difference in heat energy, and in some instances, such as schools, theaters and churches where large numbers are congregated, it is necessary from a ventilating standpoint.

What we are today dealing in, however, is the average furnace installation, with furnaces designed to operate by gravity and accustomed to installation design such as our present Standard Code. Consequently, I will endeavor to confine this talk particularly to this phase of the subject.

Let us analyze first what happens when we start the fire in the furnace. The air in the building and the heating system is practically of a uniform temperature. As the temperature of the furnace begins to rise, the air that becomes heated rises and mixes with other air in the bonnet which through turbulence naturally raises the bonnet temperature until it finally overcomes resistance in the warm air pipes and pushes itself through the registers where there is also resistance. Whatever unequal resistance there may be in the various warm air pipes will naturally cause unequal air flow through the various pipes until every warm air run is heated to the register outlet. Depending upon the care that has been exercised in designing the system will depend the results secured. It must be remembered that there is resistance to the air at the register face which may be greater than the static resistance through the system.

I believe we all know that it is seldom possible to design any of the larger, finer jobs in just the manner we would like, and we also know that the larger the job the harder it is to design it just as it ought to be. These conditions then tend to unequalize the air delivery through the various leaders to such variations in air delivery as to often find it necessary to damper certain leaders 75 per cent to 90 per cent—of course, these figures are somewhat extreme, but not uncommon on the average run of jobs. Then in order to offset these conditions, even by the most careful engineering it necessitates increasing the combustion rate and raising the air temperature to extremes. But if there is something applied that will help boost this air over these humps, then there would be no need of increased combustion to offset these irregularities, which may be anywhere from only a few degrees in temperature rise to difference so irregular that practically no method of fan could produce the anticipated conditions.

It is just these features that enter into the determination as to what is required, for furnace design casing areas and piping layouts are so radical that to arrange a universal unit to meet them has been a matter that has exhausted the efforts of many of our best heating engineers for years. What seems to have been the desire was to obtain a universal unit that would fit the average gravity job without upsetting any of the regular methods of installation, particularly not to destroy the piping arrangements to the extent of occupying an excessive amount of space in the basement. There have in the past been many units that have in some instances given the desired results.

This unit that you see before you, has filled these universal needs, regardless of the number of cold air returns and whether they were below or above the basement floor without destroying the symmetrical appearance. I want to repeat, that to our minds and in our experiences we have not found it necessary to deliver more air through the plant, but rather to create an air impingement at a high velocity against the heated surfaces, thereby naturally raising the temperature and through its design also creating a syphonic action upon all of the cold air returns to fill the gaps made by the increased velocity of the air through the booster distributer. For, if we remove the cold air from the building, the warm air will naturally flow in.

In our experience we have found that the most satisfactory way to move this air in a plant designed for gravity operation, except in cases when practically no duct work exists, was by the use of a blower, in order to insure the delivery of the proper amount of air. Each unit is designed to deliver approximately the total amount of air that the plant requires. In other words, this unit before you will deliver six hundred cubic feet of air per minute and will supply the required air on the average six or seven room house. The next size larger is what is known as our No. 55, having a capacity of approximately 900 inches of pipe area, and would be the proper size for a building such as the research residence, referred to.

This unit is designed to draw its air supply either from the cold air ducts or from a separate location. If the application is properly made, it assures a total air delivery equal to the plant based and designed in accordance with the Standard Code.

Its operation is an advantage every time that additional heat is required. Oftentimes the room temperatures have fallen even with a reasonable fire, but perhaps caused by rising wind or opening doors or windows, in which case it is but necessary to turn on the booster for a few minutes in order to bring the temperature up again, whereas without the booster it might even necessitate poking the fire and shaking the grates in addition to opening the drafts. Under those conditions this manner of securing the results is not only economical, but responsive to any reasonable needs.

Who Manufactures "Warner Humidifiers"?

To American Artisan:

Kindly inform us who manufactures the "Warner Humidifiers."

Empire Sales Company,
624 South Sixth Street,
Louisville, Kentucky.

Gas Heating—the SHEET METAL AND FURNACE Dealer's Opportunity

A Partial Review Gas-Fired Furnace-Possibilities and Mechanical Detail Necessities

By Edwin A. Jones*

BENJAMIN FRANKLIN, the father of American science and invention, built the first warm air furnace. For more than 150 years engineers, like Franklin, have been striving for effortless, safe, uniform, clean and economical heat. Modern gas furnaces are the development of this accumulated research. They embody no revolutionary discoveries, no wonderful invention, and present no mystery.

Gas is the only clean fuel.

The installation cost of gas-fired warm air furnaces is less than any other type of automatic heat.

The cost of heating with an efficient gas-fired furnace with manufactured gas at the price charged for this service in the average community is but little more than with anthracite and less than with oil, when all items of cost are included in comparison. The operating cost with gas can be accurately calculated, since we have known efficiencies and heat losses. This computation cannot be accurately made with other fuels. Where natural gas is available its use in an efficient furnace usually secures the lowest heating costs.

Nearness of Unit to Registers Made Possible

The installation of gas furnaces requires no more skill than required to properly put in the usual type and the correct proportioning of leads and returns if probably simpler.

Gas-fired furnaces may be installed in units distributed close to delivery registers, permitting installation of warm air heating plants in types of residences and buildings in which the use of other types of warm air furnaces would not be feasible.

They are particularly suited to use with fans in churches, industrial buildings, large residences, etc. In many buildings of this type their installation may be made in spaces where due to lack of fuel storage facilities and chimney connections it would otherwise be necessary to heat the air with steam coils.

Automatic Even to Ordering Fuel

Properly designed and equipped gas furnaces are automatic even to ordering the fuel. The only effort required from the user is the winding of the clock once a week, the room thermostat controlling heat during the day, with but imperceptible variations, and reducing and raising the temperature night and morning automatically. When gas furnaces are equipped with limit controls and safety pilots, the furnace cannot overheat, nor can gas escape.

These controls are no more complicated than the heat regulators and damper controls installed with coal furnaces. Gas furnaces require no motors, blowers, spark plugs, or machinery. Therefore, the dealer will not be called back on frequent service calls, and the original profit of the sale will remain in the till.

The average warm air contractor depends on new installations with a slim margin for his volume, and replacement work with limited volume for his profit.

Manufacturers of furnaces report larger sales of high-grade equipment for replacement than for new installations. The average home owner is willing to pay for a better heating plant, and when purchasing such equipment places the order with a contractor in whom he has confidence.

Bulk of Business Non-Competitive

The market for gas-fired furnaces for the dealer who goes after replacements is unlimited, and the bulk of this business is non-competitive.

New building business is profitable with gas furnaces. Where the dealer suggests a gas furnace to an architect or builder, shows its advantages, explains its operation, and sells the idea, he is not apt to have to compete with the irresponsible tinner with no ideas, who probably believes he has no overhead.

Gas company co-operation is available for dealers in gas furnaces in most cities. Many gas companies maintain an active sales force, supported by advertising, displays, etc., call on the prospects, bring them to the dealer and hand him the job on a silver platter, as it were.

What Are Mechanical Requirements?

A few gas companies sell and install gas furnaces direct in competition with the trade. These companies, however, almost without exception, invite competition from local contractors and prices secured for direct sales would leave a generous margin for the dealer.

Most gas companies take care of minor adjustments and service calls from users of gas heating equipment, which is approved as to design, safety and efficiency by the American Gas Association Testing Laboratory, established and maintained by the gas industry to aid and protect the standards of gas utilization. The sheet metal contractor should confine his purchases to lines so approved.

Having discussed the market and

*Address on "Gas Heating, the Sheet Metal Dealers' Opportunity," by Edwin A. Jones, L. J. Mueller Furnace Company, Milwaukee, Wisconsin, delivered at the convention of the Michigan Sheet Metal and Roofing Contractors' Association, Kalamazoo, Michigan, March 5 to 8, 1928.

business opportunities, we should consider the mechanical and practical requirement of a gas furnace.

All gas, whether manufactured or natural, is composed of carbon and hydrogen. In natural gas these are principally in chemical combination in the form of CH_4 methane. In manufactured gas there is a considerable percentage of free hydrogen in the form H_2 and carbon monoxide CO. There is also present particularly in manufactured gas some sulphur, usually in the form of H_2S hydrogen sulphide. The calorific value of natural gas averages about 1,000 B.t.u.'s and that of manufactured gas about 550 B.t.u.'s per cubic feet.

When gas burns the carbon and hydrogen combine with oxygen, the carbon to form CO_2 and the hydrogen to form water, this chemical reaction being $2\ H_2+O_2$ equals $2\ (H_2O)$. When we burn 1,000 cubic feet of manufactured gas we produce nearly 5 gallons of water.

To secure complete combustion we must mix with the gas for combustion approximately 1 part of air for each 100 B.t.u. per cubic feet of gas. Less than half of the amount of air required for combustion can be supplied mixed with the gas at the burner inlet as primary air. The balance is supplied to the flame during combustion. It is not possible to secure complete combustion with the exact amount of air theoretically required and no more, some of it will pass between or around the flame or more come in contact with one portion of the burner than that part requires.

It is desirable that excess air passed through the furnace be held to a minimum.

Cast Iron Only Metal Suitable for Gas Furnaces

A good gas appliance may secure complete combustion with as little as 20 to 30 per cent excess. To secure this result, the burner and combustion chamber must be co-ordinated in design, just as the piston and cylinder in an engine.

Cast iron is the only metal suited to use in gas warm air furnaces.

The products of combustion of gas are saturated with water vapor and contain more or less sulphur dioxide. This causes the deposit of a solution of sulphurous acid on the internal heat absorbing surfaces, and where sheet metal is used its life may be usually measured in months.

Accurately ground iron to iron joints are the only type that remain permanently tight, and one of the important requirements for a gas furnace is that it be absolutely tight and remain so.

The specific heat of a cast iron furnace also acts as a balance to insure uniform results. Its heat retaining qualities eliminate cold floors and reversed air circulation during periods when the burner is off.

The gas furnace should have ample heating surface, and that surface should be presented to thin streams of flue gas, so that the heated products of combustion may secure a scrubbing action. It is desirable that the radiator surfaces of gas furnaces be heavily ribbed to secure lower temperature of the metal and greater heat absorption.

Each Burner Should Have Separate Radiators

The combustion chamber and flue area should be as small in volume as possible, and it is desirable that each burner have entirely separate radiators and combustion chambers. If proper consideration is given these requirements, no volume of gas can collect large enough to cause a damaging explosion, regardless of carelessness in operation or tampering with controls.

It is just as important with gas as with other fuel that all internal surfaces be accessible for cleaning. Some gas, particularly coal gas and by-product gas deposits an incombustible compound on heating surfaces, which if not actually clogging flues will greatly decrease the efficiency of the unit, and there is always a possibility that at some time there will be poor adjustment of burners, and soot will collect.

Gas furnaces should be inspected once a year, cleanout plates removed and flues cleaned with a wire brush if necessary. If this practice is followed, maximum efficiency will be maintained.

The best general results and highest efficiencies are secured with a flue temperature of from 375 to 475 degrees. It is a mistake to believe that a very low flue temperature indicates high efficiency. It usually indicates an excess of air passing through the combustion chamber, chilling the flame and heating surface and causing loss of efficiency. Low flue temperatures indicate very inactive heating surface, and will cause condensation of moisture from the products of combustion, which means trouble from wet breeching and chimneys.

Construction Must Provide Ample Free Air

Individual unit or sectional construction with square casing lends itself most admirably to gas furnace design. Casing should be double to reduce heat loss in basement. Gas furnaces should be so constructed that ample free area for easy circulation is secured. Sections should be so spaced that there can be no overheating of castings. There should be a generous space provided for return air connections at ends and rear, with ample air passages beneath the sections for equalization. All heating surface should be located at such height above return connections that circulation is positive.

Gas furnaces should be supplied with all equipment necessary to make them absolutely automatic and secure safe and satisfactory functioning without thought or effort on the part of the operator.

They should be equipped with automatic humidifiers, gas-pressure regulators to insure uniform gas supply, regardless of fluctuations in street pressure, safety pilots to turn off all gas in event that any pilot becomes extinguished, and a limit control located in the hood to turn off the gas in event of overheating of the furnace through closing all registers, placing a rug over the cold air return or other emergency. The gas valve operating from the room thermostat should close in the event of current failure. Magnetic

gas valves with all electric control make the simplest and most satisfactory equipment.

Gas can be burned efficiently only in units designed for gas, and the installation of conversion burners or gas rings in coal furnaces is to be discouraged. They are neither safe nor efficient. The cost of operation is prohibitive, except with cheap natural gas. The U. S. Bureau of Mines in a pamphlet devoted to the conservation of natural gas, states conversion jobs use more than twice as much gas as well designed gas furnaces.

Won't Send a Salesman 150 Miles for a $15 Order of Goods

Present Day Business Requires Close Concentration of Effort

The accompanying article by William Boyd Craig, appearing in a recent issue of the Nation's Business, contains some excellent pointers on the conduct of business which can be adopted and utilized very conveniently and profitably by warm air furnace installers and sheet metal contractors.

This article points out in a very direct manner how a man can make money by turning down business as well as by accepting business. The article illustrates forcibly the fallacy of worshipping at the shrine of volume to the extent of neglecting the profit.

"WE ARE through sending out a 5-ton truck to deliver a carpet tack.

"We will not send a salesman 150 miles for a $15 order.

"As wholesalers we have cut down the variety of merchandise handled until now we have eliminated all but the hardware items. These, with few exceptions, show us a profit.

"In short, we have ceased to worship at the shrine of Volume.

"In the future we will not try to sell everybody, everything, everywhere. It can't be done! At least, we found that we couldn't do it profitably.

"We are in business to stay—prepared for the long haul!"

The speaker was Lewis H. Bronson of Bronson & Townsend, hardware wholesalers of New Haven.

Throughout the country wholesalers and retailers are beginning to wonder if the volume of business done is the true index of success. What others dreamed of, this firm did.

It started several years ago to cut off one-fifth of the manufacturers from whom it bought. It cut down the number of varieties handled by one-third. It clipped off 30 per of its sales territory. And, most startling of all, it crossed over one-half of its customers from its books. It did so fearlessly, with eyes open, and looking ahead.

This retrenchment—this decision to make an efficient little business rather than a big business—brought results. This apparently reckless slashing of business resulted in a queer thing, a sort of paradox. It reduced the volume and scope of business done, but it increased the net profits by more than one-third.

Refusing to go after cash orders when you know they are there is heresy to this age which puts such emphasis on super-selling. Mr. Bronson's company came to the absurdly simple conclusion that it was better to let its competitors have the unprofitable business. I asked Mr. Bronson if he wouldn't explain some of his business philosophy. Any man who turns down orders and makes money by it is worth listening to.

We are in business to sell hardware efficiently. We have always believed in 'old-line' distribution, that is, manufacturer to wholesaler to retailer. These three links in the distribution chain have a common aim. They all want to make the consumer buy and then buy again. There is no true profit for any one of the three until a customer makes his second purchase.

"We believe in branded goods, but not merely because they are branded. Efficient merchandising, of course, means getting an article into the consumer's hands cheaply and easily, but with no sacrifice in quality. We believe that a hardware store should be a hardware store. They are our natural customers. Too many are a little of this and that and something else. We have quit selling to retailers in other lines who introduce only one or two items, thus competing with our best customers.

"No sale for us is a good one unless it keeps the cost of distribution down. We can't make a carpenter use two saws where he had one before.

"The idea that mass production keeps the unit down is true. The idea that mass action—doing things in a big way—is invariably good, is not always so true. Mass distribution adds to the consumer's price as the selling gets more forced and more expensive. He has to pay the price of 'being sold,' and he can't do it past a certain point. Too few men in business realize that the cost of production is only a very small item in the retail price of mass merchandising. Henry Ford has done business a lot of harm by selling his idea of large-scale operation so successfully.

"Only recently has the plainly marked price been universal among retailers. The twentieth century, generally speaking, brought a close to the idea that every retail transaction should be a bargaining process. A retailer offers John Smith and me the same suit for the same price. Wholesalers haven't come to do this on a very large scale. We have, because we found that it paid, once our customers understood it, to

offer a keg of nails to all at the same price. They are quite sure that none of their competitors are getting price concessions from us. This works an occasional hardship when a competitor cuts a price, but we remind our customers that a house that features 'leaders' will make up that absence of gain by boosting the price on something else. No man can buy bargains always any more than he can always get something for nothing.

"We tell our regular customers what it costs us to do business. We tell them we are in business to make money. We will give them the complete cost figures for, let us say, twelve lawnmowers. We tell them that we think 3 per cent is a fair profit for us. They are, of course, at liberty to compare these figures with any other data they get from other houses. No other firm or group of firms can offer them better prices consistently.

"If they will go along with us on this basis and give us their business over some time, we tell them that we believe that the loyalty to our house should have a financial return as long as that loyalty is kept working for our company. Our invested capital pays us when it works for us. Customers' loyalty pays them when it works to our advantage. We are paying regular dividends to many of our customers.

"By considering our business a laboratory, we found that we could make our cost figures mean something. For instance, we sell to a certain group of merchants in a certain territory. We found that, to appraise it best, we should look at it with the eyes of a buyer rather than of a seller. Our sales cost money. In a literal sense, we buy them. It is easier somehow for a buyer to think of costs than it is for a seller."

Two anecdotes they tell about this house seem to me to say a lot.

Some years ago a Springfield man decided to start a hardware store with his savings of $2,000. He stopped in to buy his complete stock from this company. They told him that they were glad to get the order. Initial orders of the type are "plums" to any wholesale house. They asked the buyer why he chose them. The prospective customer replied that they had a reputation for honesty. They thanked him by saying that they liked kind words as well as anybody. The wholesaler went on to say that they would probably show him that they were honest. He was asked to describe his set-up, what he expected it to cost him to do business, etc. When the figures were completed the firm refused the order. He protested that it was cash, that there was nothing to lose. The company's reply was that under his plan the buyer had something to lose, and that, even though the order was a big one, they would not start a man on the road to bankruptcy. This man then made his purchase from a rival. Eight months later he failed.

Also I heard a story about a stand this company had taken during a recent New England building boom. Nails were selling in Boston at $6.50 a keg, but Mr. Bronson's company continued to sell them for $4.50 per keg, which included their profit. By refusing to raise the price $2 the firm failed to realize a possible net profit of nearly $90,000 in six months. I had heard of men who refused to cut their prices, but seldom had I known of anyone who refused to raise his price when others were doing it.

So I asked Mr. Bronson if this method of doing business satisfied him.

"Oh, yes; it does," he said, "it pays in the long run.

"The next year there was a sharp slump. Everyone cried, 'What's the matter with New England?'—and our competitors dipped in the red ink. We had one of our best years."

Creosote Formation Caused by Condensation in Chimney

In our March 3rd issue there appeared an inquiry concerning the causes of creosote forming when wood is burned.

Allen W. Williams, Secretary of the National Warm Air Heating and Ventilating Association, Columbus, Ohio, says in regard to this inquiry, "Where wood is burned as a fuel, the creosote formation occurs because the distillation which takes place is not kept in a vapor form until it leaves the chimney but condenses inside of the chimney.

"It often comes from burning rather green fuel and also occurs when the weather is not cold enough to require a hot enough fire to keep the creosote in the form of a vapor. It is difficult to suggest any positive remedy."

"I think you can also see that in a heater where there is a long flue travel the temperature of the flue and the gases in the flue are lower than in a direct draft. Even at best it is difficult to eliminate this condensation entirely."

Iowa Sheet Metal Contractors' Association short course to be held at the university at Ames, Iowa, March 14, 15 and 16, 1928.

American Oil Burner Association, Hotel Stevens, Chicago, April 3, 4 and 5, 1928. Headquarters, 350 Madison Avenue, New York; Leod D. Becker, Managing Director.

Illinois Sheet Metal Contractors' Association, Fort Armstrong Hotel, Rock Island, April 11 and 12. Secretary Fred J. Graeff, 222 East Washington Street, Springfield, Illinois.

Southern Hardware Jobbers Association, American Hardware Manufacturers Association, Edgewater Gulf Hotel, Biloxi, Mississippi, April 16 to 19, 1928. Secretary-Treasurer John Donnan, 923 American National Bank Building, Richmond, Virginia.

National Warm Air Heating and Ventilating Association, Hotel Stevens, Chicago, Illinois, April 24, 25 and 26, 1928. Secretary Allen W. Williams, 174 East Long Street, Columbus, Ohio.

Texas Sheet Metal Contractors' Association, Houston, Texas, May 7 and 8, 1928. Secretary, Harry L. Stanyer, 2422 Alamo Street, Dallas.

National Association of Manufacturers of Heating and Cooking Appliances, Hotel Statler, Detroit, Michigan, May 9 and 10. Secretary Allen W. Williams, 174 East Long Street, Columbus, Ohio.

Arkansas Retail Hardware Association, Little Rock, during the month of May, exact dates for the meeting to be determined later. L. P. Biggs, secretary, 815-16 Southern Trust Building, Little Rock.

Indications Are That Steel Output Has Reached Its Crest—Heavy Finished Steel Specifications Are Broad

Pig Iron Shipments Are Heavy—Nonferrous Buying Continues Light

FINISHED steel has given some indications in the past week that it has reached the crest of its first-quarter effort in production and that the upswing in prices proceeds at a decelerated gait. Among these indications are the more stationary level of ingot operations, and renewed caution by buyers in committing themselves.

There is no minimizing the strength of steel's present position. Ingot production, at about 90 per cent for Steel corporation subsidiaries and 85 per cent for all makers, compares with 88 per cent a year ago and is likely to hold the remainder of March. Specifications for heavy finished steel for March shipment continue broad, and for some of the lighter lines have increased perceptibly.

The third advance in less than four months has not impressed consumers with the necessity for heavier commitments. Automotive specifications anticipate the spring peak in car assembly usually reached early in the second quarter, rail mills are now at capacity, implement makers are ending their spring runs and structural fabricators have protected themselves against expected spring building programs.

Pig Iron

At Pittsburgh shipments by merchant blast furnaces are amounting to 10,000 to 12,000 tons monthly and indicate heavy bookings late last year and this quarter. The fact that specifications on contracts are holding up well is the market's only encouraging feature, although a certain amount of quiet buying is in progress for second quarter, principally extensions of present arrangements.

Many buyers are protected for the entire first half. Spot market inquiries are scarce and confined to small filling-in tonnages. A few small lots of malleable were sold in the past week at the same price. Bessemer iron is selling in single carloads at $17.50, valley. Basic is nominal at $17, valley.

Basic pig iron sold at an average price of $17 a ton last month for the fifth consecutive month. This compares with $18 a year ago and $20 in February, 1926.

The base price of $18.50, Chicago furnace, is steady for second quarter, although some short sales are noted in this district at 25 cents under the market, in small lots. Several lots of silvery iron have been placed in the Northwest at the Jackson county schedule.

Sales of pig iron for second quarter are noted. The probable make in April is almost covered. The price is $16, base, Birmingham. Furnace interests believe buying will be steady but in small lots.

Copper

Copper quotations have ranged between 13.87½ cents and 14.12½ cents, Connecticut. Most metal was held at the higher asking price all week but a little was available and sold below 14.00 cents. On Monday the latter figure became the minimum and today this price disappeared. The export market has been quiet but unchanged at 14.50 cents c.i.f. European port.

Tin

Tin prices fluctuated in the usual manner without any decided trend. The recent recovery was lost, the former low point touched and then the market became stronger and more active. Today the market eased off again. Business for the week was light. Statistics for February showed limited stock in this country and less than average deliveries, while the world visible supply increased in a big jump of 2,401 tons to 17,645 tons, the largest in several years.

The market expected this weak showing and accordingly went down while anticipating the news, and then as is customary became firmer with its publication. Indications are that supplies will continue plentiful even should larger use be reflected in the statistics.

Lead

After the drop of 6.00 cents, New York, it was thought that perhaps users would regard the market as being unusually low and therefore in a good buying position. Some increase in business came out but it was mostly of small lots for early shipment.

Zinc

Business in zinc has continued light but the market has rebounded naturally from the gradual slip to the lowest price in several years. Business was done at 5.45 cents and then 2½ to 5 points higher. The recovery was largely due to the recovery in ore of $1 to $36 a ton. High grade zinc is in increasing supply but the spot price is unchanged. The bulk of the business is done at a differential a little over prime western delivered.

Solder

Chicago warehouse prices on solder are as follows: Warranted 50-50, $32.50; Commercial 45-55, $29.50; plumbers', $26.50; all per 100 pounds.

Old Metals

Wholesale quotations in the Chicago district, which should be considered as nominal, are as follows: Old steel axles, $16.00 to $16.50; old iron axles, $21.50 to $22.00; steel springs, $15.00 to $15.50; No. I wrought iron, $11.00 to $11.50; No. 1 cast, $12.75 to $13.25, all per net tons. Prices for non-ferrous metals are quoted as follows, per pound: Light copper, 9 cents; zinc, 3½ cents; cast aluminum, 13¾ cents.

Wheeling
CORRUGATING COMPANY

Doubly Durable Because Doubly Protected

1 The base metal is the highly rust-resistant Copper Alloy, known everywhere as Ohio Metal.

2 The conductor is completely formed and finally *hand-dipped in pure molten zinc.*

A SAMPLE of Wheeling Hand-Dipped Conductor will enable you to judge why the trade, generally, accepts it as the most satisfactory and the most economical conductor made.

Note that the metal base is completely imbedded in a thick, impenetrable protective coating of pure zinc. Note also that the seams, edges and surfaces are thoroughly and uniformly covered—the result of *hand-dipping after forming.*

Exposed to the air, the zinc first protects itself by a natural surface oxidization. This ceases abruptly after closing the pores of the zinc and a lasting barrier to the elements is the result.

Made of Ohio Metal, hand-dipped in pure molten zinc, this conductor is stronger, more rigid and doubly durable. Let us send you a sample for close-up inspection.

Wheeling

HAND DIPPED CONDUCTOR

Wheeling Corrugating Company, Wheeling, W. Va.

NEW YORK PHILADELPHIA CHICAGO KANSAS CITY
ST. LOUIS RICHMOND CHATTANOOGA MINNEAPOLIS

Chicago Warehouse Metal and Furnace Supply Prices

AMERICAN ARTISAN is the only publication containing Western Metal, Furnace Supply and Hardware prices corrected weekly

METALS

PIG IRON

Chicago Fdy., No. 2	$18 50
Southern Fdy. No. 2	22 01
Lake Superior Charcoal	27 04
Malleable	18 50

FIRST QUALITY BRIGHT TIN PLATES

1C	20x28 112 sheets	$25 10
IX	20x28	29 60
IXX	20x28 56 sheets	16 20
IXXX	20x28	17 55
IXXXX	20x28	18 95

TERNE PLATES

		Per Box
IC	20x28, 40-lb. 112 sheets	$25 00
IX	20x28, 40-lb. 112 sheets	27 75
IC	20x28, 25-lb. 112 sheets	21 15
IX	20x28, 25-lb. 112 sheets	23 80
IC	20x28, 20-lb. 112 sheets	19 55
IV	20x28, 20-lb. 112 sheets	22 05
IC	20x28, 15-lb. 112 sheets	18 05

"ARMCO" INGOT IRON PLATES

No. 8 ga. up to and including ¼ in.—100 lbs. $4 55

COKE PLATES

Cokes, 80 lbs., base, 20x28	$13 60
Cokes, 90 lbs., base, 20x28	13 80
Cokes, 100 lbs., base, 20x28	14 00
Cokes, 107 lbs., base, IC 20x28	14 20
Cokes, 125 lbs., base, IX 20x28	16 40
Cokes, 155 lbs., base, 56 sheets	9 20
Cokes, 175 lbs., base, 56 sheets	10 05
Cokes, 195 lbs., base, 56 sheets	10 90

BLUE ANNEALED SHEETS

Base 10 ga. per 100 lbs.	$3 50
"Armco" 10 ga. per 100 lbs.	4 00

ONE PASS COLD ROLLED BLACK

No. 18-20 per 100 lbs.	$3 75
No. 22 per 100 lbs.	3 90
No. 24 per 100 lbs.	3 95
No. 26 per 100 lbs.	4 05
No. 27 per 100 lbs.	4 10
No. 28 per 100 lbs.	4 20
No. 29 per 100 lbs.	4 35
No. 30 per 100 lbs.	4 45

"ARMCO" GALVANIZED

"Armco" 24 ....per 100 lbs. $6 15

GALVANIZED

No. 16 per 100 lbs.	$4 30
No. 18 per 100 lbs.	4 45
No. 20 per 100 lbs.	4 60
No. 22 per 100 lbs.	4 65
No. 24 per 100 lbs.	4 80
No. 26 per 100 lbs.	5 05
No. 27 per 100 lbs.	5 15
No. 28 per 100 lbs.	5 30
No. 30 per 100 lbs.	5 70

BAR SOLDER

Warranted

50-50 .....per 100 lbs. $32 50

Commercial

45-55 .....per 100 lbs.	29 50
Plumbers ...per 100 lbs.	26 50

ZINC

In Slabs ..... $ 8 50

SHEET ZINC

Cash Lots (600 lbs.)	$12 00
Sheet Lots	13 00

BRASS

Sheets, Chicago base	17¾c
Mill base	18c
Tubing, brazed base	26¾c
Wire, base	18¼c
Rods, base	15½c

COPPER

Sheets, Chicago base	22¾c
Mill base	21¼c
Tubing, seamless base	25¾c
Wire, No. 9, B & S Ga.	19¾c
Wire, No. 10, B & S Ga.	19c
Wire, No. 11, B & S Ga.	18¾c
Wire, No. 2, B & S Ga. and heavier	18½c

LEAD

American Pig	$7 00
Bar	8 00

TIN

Pig Tin .....per 100 lbs.	$59 00
Bar Tin .....per 100 lbs.	60 00

HARDWARE, SHEET METAL SUPPLIES, WARM AIR FURNACE FITTINGS AND ACCESSORIES.

ASBESTOS

Paper up to 1/16	6c per lb.
Roll board	6¼c per lb.
Mill board 3/32 to ⅛	6c per lb.
Corrugated Paper (250 sq. ft. to roll)	$6 00 per roll

BRUSHES

Hot Air Pipe Cleaning

Bristle, with handle, each $0 85

Flue Cleaning

Steel only, each..... 1 25

BURRS

Copper Burrs only 40-2½%

CEMENT, FURNACE

American Seal, 5-lb. cans, net	$ 40
American Seal, 10-lb. cans, net	80
American Seal, 25-lb. cans, net	2 00
Pecora .....per 100 lbs.	7 51

CHIMNEY TOPS

Adams' Revolving	Wt. Doz.	Price Doz.
4 in.	21 lbs.	$11 00
6 in.	24 lbs.	11 50
7 in.	30 lbs.	13 50
8 in.	33 lbs.	15 00
9 in.	51 lbs.	16 50
10 in.	56 lbs.	18 00
12 in.	66 lbs.	22 00
14 in.	110 lbs.	36 00

CLINKER TONGS

Front Rank, each	$0 75
Per doz.	8 40

CLIPS

Damper

Adams No-Rivet Steel, with tail pieces, per gross....$9 00
Tail pieces, per gross..... 2 50

COPPERS—Soldering

Pointed Roofing

3 lb. and heavier .....per lb.	40c
3½ lb. .....per lb.	45c
2 lb. .....per lb.	48c
1½ lb. .....per lb.	55c
1 lb. .....per lb.	60c

CORNICE BRAKES

Chicago Steel Bending

Nos. 1 to 6B.....Net

CUT-OFFS

Gal., plain, round or cor. rd.

26 gauge	30%
28 gauge	35%

DAMPERS

"Yankee" Hot Air

7 inch, each 20c, doz.	$1 60
8 inch, each 25c, doz.	2 20
9 inch, each 30c, doz.	2 60
10 inch, each 32c, doz.	2 80

Smoke Pipe

7 inch, doz.	$1 60
8 inch, doz.	2 20
9 inch, doz.	3 00
10 inch, doz.	3 75
12 inch, doz.	4 50

ADAMS No. 1 CHECK

Check and Collar Complete

8 inch, each	2 00
9 inch, each	2 25

End Check Only

8 inch, each	1 60
9 inch, each	1 85

Collar Only

8 inch, each	50
9 inch, each	65

No. 2 CHECK

8 inch, each	1 00
9 inch, each	1 00

10% Disc. on Adams No. 1 and No. 2 Check

Diamond Smoke Pipe

7 inch, doz.	$ 2 00
8 inch, doz.	3 20
9 inch, doz.	4 80
10 inch, doz.	6 00

Adams' Sheet Metal

7 inch, doz.	$ 1 60
8 inch, doz.	2 20
9 inch, doz.	2 60
10 inch, doz.	2 80
12 inch, doz.	3 50
14 inch, doz.	5 00

DIGGERS

Post Hole

Iwan's Split Handle (Eureka)
4-ft. Handle ..per doz. $14 00
7-ft. Handle ..per doz. 36 00
Iwan's Hercules pattern, per doz. 14 00

EAVES TROUGH

Galv. Crimpedge, crated 75 & 5%
Zinc, "Barnes" 60%

ELBOWS

Conductor Pipe

Galv. plain or corrugated, round flat Crimp.

28 Gauge	60%
26 Gauge	45%
24 Gauge	15%

Galv. & Terne Steel

Plain Rd. and Rd. Corr.:

28 Ga.	60%
26 Ga.	45%
24 Ga.	15%

Square Corrugated

No. 28 Gauge	50%
26 Gauge	35%

Portico Elbows

Standard Gauge Conductor Pipe, plain or corrugated.
Not nested .....70 & 5%
Nested Solid .....70 & 5%

Sq. Corr., A. & B. & Octagon

28 Ga.	50%
26 Ga.	35%

Portico

1", 1¼", 1½".....45%

Copper

16 oz., all designs.....50%

Zinc—

All styles 60%

ELBOWS—Stove Pipe

1-piece Corrugated. Uniform Blue "Milcor" No. 28 Gauge.

	Doz.
5-inch	$1 05
6-inch	1 20
7-inch	1 75

Special Corrugated

6-inch	$1 00
7-inch	1 60

Adjustable—Uniform Blue

"Milcor" No. 28 Gauge. Uniform Blue.

5-inch	$1 55
6-inch	1 75
7-inch	2 10

WOOD FACES—50% off list.

FENCE

726-6-12½% (100 rods)	$28 68
1948-6-14½% (100 rods)	42 62

FILES AND RASPS

Heller's (American)	50-10%
American	60-10%
Arcade	50%
Black Diamond	50%
Eagle	50%
Great Western	50%
Kearney & Foot	50%
McClellan	50%
Nicholson	50%
Simonds	60%

FIRE POTS

Clayton & Lambert's

East of west boundary line of Province of Manitoba, Canada, No. Dakota, So. Dakota, Nebraska, Kansas, Oklahoma, Amarillo, San Angelo and Laredo, Texas 52%
West of above boundary.....48%

Geo. W. Diener Mfg. Co.

	Ea.
No. 02 Gasoline Torch, 1 qt.	$ 5 55
No. 0250, Kerosene, or Gasoline Torch, 1 qt.	7 50
No. 10 Tinner's Furn. Square tank, 1 gal.	12 60
No. 15 Tinner's Furn. Round tank, 1 gal.	12 00
No. 21 Gas Soldering Furnace	3 60
No. 110 Automatic Gas Soldering Furnace	10 50

Double Blast Mfg. Co.

Gasoline, Nos. 25 and 36...60%

Quick Meal Stove Co.

Vesuvius, F. O. B. St. Louis 30%
(Extra Disct. for large quantities.)

GALVANIZED WARE

Pails (Galv. after made), 10-qt.	$2 12
Tubs (Galv. after made).	
No. 1	6 00
No. 2	6 85

GLASS

Single Strength, A, 52-in. brackets	87%
Single Strength, A, 24 to 40-in. bracket	86%
Single Strength, A, all other brackets	89-5%
Double Strength, A, all sizes	89%

HANGERS

Conductor Pipe

Milcor Perfection Wire.....25%
Milcor Triplex Wire.....10%

Eaves Trough

Milcor Steel (galv. after forming) List ....plus 12½%
Milcor Selflock E. T. Wire, List .....plus 50%

HOOKS

Box

V. & B. No. 1, each.....$0 26

Conductor

"Direct Drive" Wrought Iron for wood or brick..15%

Hay

V. & B. No. 1, each.....$0 26

HUMIDIFIER

"Front-Rank," Automatic

In single lots	50%
In lots of 10 or more	50-5%
In lots of 25 or more	50-10%
Vapor pans, etc., each	50%

LIFTERS

Stove Cover

Coppered .....per gro.	$6 00
Alaska .....per gro.	4 75

MALLETS

Tinners

Hickory .....per doz. $2 25

MITRES

Galvanized steel mitres.

28 Ga.	70
26 Ga.	60-20

NAILS

Cut Steel	$4 25
Cut Iron	4 25

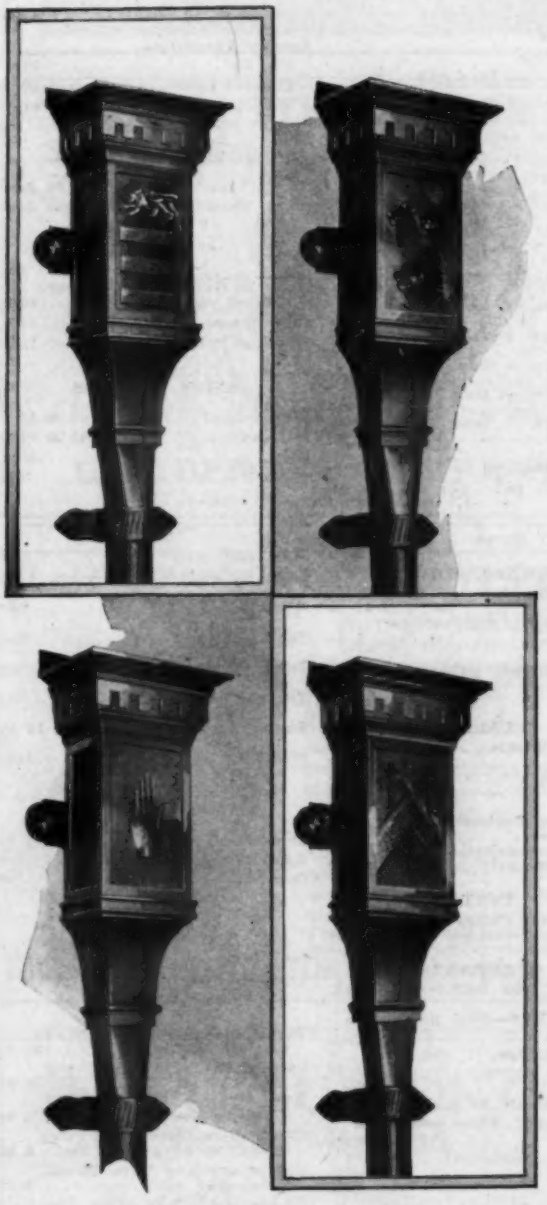
Wire

Common	3 10
Cement Coated	3 10

(Continued on Page 82)

Special Leaderhead Designs in Anaconda Copper

Wrought by hand in the shop of Klein & Kavanagh, Inc., New York



These unusual leaderheads, all of the same size and shape but with different panel decoration, were designed by the architectural firm of Hyde & Shephard and wrought by hand in the shop of Klein & Kavanagh. This firm specializes in high class work for architects and enjoys a long established reputation for good craftsmanship.

For many years Klein & Kavanagh have used Anaconda Copper exclusively on all their copper jobs. Their opinion of Anaconda Copper is expressed in the following quotation from a recent letter:

> *"We use Anaconda Copper exclusively because it is always uniform and dependable. We find it the most pliable copper obtainable."*

Pure copper is the most economical for sheet metal work because it lasts indefinitely—and Anaconda Copper is guaranteed 99.9% pure.

Stocks in the form of sheets, rolls and Economy Strip are maintained by leading distributors everywhere. Ask for Anaconda.

THE AMERICAN BRASS COMPANY
GENERAL OFFICES: WATERBURY, CONNECTICUT
Offices and Agencies in Principal Cities
Canadian Mill: ANACONDA AMERICAN BRASS LTD., New Toronto, Ont.

ANACONDA COPPER
BRASS ANACONDA from mine to consumer BRONZE

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NETTING, POULTRY

Galvanized before weaving 57½-5%
Galvanized after weaving.52½-5%

PASTE

Asbestos Dry Paste:

200-lb. Barrel	$16 00
100-lb. barrel	8 75
25-lb. pail	3 50
10-lb. bag	1 10
5-lb. bag	60
2½-lb. cartons	35

PIPE

Conductor
Cor. Rd., Plain Rd., or Sq.

Galvanized
Crated and nested (all gauges) 75-2½%
Crated and not nested (all gauges) 70-15%

Furnace Pipe
Double Wall Pipe and Fittings 50%
Single Wall Pipe, Round Galvanized Pipe 50%
Galvanized and Tin Fittings 50%

Lead
Per 100 lbs. $12 50

Stove Pipe
"Milcor" "Titelock" Uniform Blue Stove

28 gauge, 6 inch U. C. nested	10 50
28 gauge, 6 inch U. C. nested	11 00
28 gauge, 7 inch U. C. nested	12 00
30 gauge, 6 inch U. C. nested	9 00
30 gauge, 6 inch U. C. nested	10 00
30 gauge, 7 inch U. C. nested	12 00

T-Joint Made up
6-inch, 28 ga....per doz. $ 4 00

All Zinc
No. 11, all styles.....60%

POKERS, STOVE

W'r't Steel, str't or bent, per doz.	$0 75
Nickel Plated, coil handles, per doz.	1 10

POKERS, FURNACE

Each $0 50

PULLEYS

Furnace Tackle....per doz.	$0 60
.....per gro.	6 00
Furnace Screw (enameled) .....per doz.	75

Ventilating Register

Per gross	9 00
Small, per pair	30
Large, per pair	50

PUTTY

Commercial Putty, 100-lb. Kits $3 40

QUADRANTS

Malleable Iron Damper.....10%

REDUCERS—Oval Stove Pipe

	Per Doz.
7—6, 28-gauge, 1 doz. in carton	$2 00

REGISTERS AND BORDERS

Baseboard, Floor and Wall.
Cast Iron 20%
Steel and Semi-Steel.....40-10%
Baseboard 40-10%
Wall 40-10%
Adjustable Ceiling Ventilators 40-10%

Register Faces—Cast and Steel
Japanned, Bronzed and Plated, 4x6 to 14x14.....40-10%
Large Register Faces—Cast, 14x14 to 38x42 .....60-10%
Large Register Faces—Steel, 14x14 to 38x42.....65-10%

RIDGE ROLL

Galv., Plain Ridge Roll, b'did 75-10-5%
Galv., Plain Ridge Roll crated 75-10%
Globe Finials for Ridge Roll..50%

ROOFING

	Per Square
Best Grade, slate surf, prepared	$ 2 30
Best talc surfaced	2 65
Medium talc surfaced.....	2 00
Light talc surfaced.....	1 30
Red Rosin Sheeting, per ton	57 00

SCREWS

Sheet Metal

7, ⅛x⅛, per gross	$0 52
No. 10, ¾x3/16, per gross	68
No. 14, ⅞x¼, per gross..	89

SHEARS, TINNERS' & MACHINISTS'

Viking $23 00

Lennox Throatless
No. 18 .....35%
Shear blades 10%
(f. o. b. Marshalltown, Iowa)

SHIELDS, REGISTER

No. 1 "Gem" floor.....$12 00 doz.
No. 2 "Gem" wall..... 6 00 doz.

SHOES

Galv. 28 Gauge, Plain or corrugated round flat crimp...60%
26 gauge round flat crimp....45%
24 gauge round flat crimp....15%

SNIPS, TINNERS

Clover Leaf .....40 & 10%
National .....40 & 10%
Star 50%
Milcor .....Net

SQUARES

Steel and Iron .....Net
(Add for bluing $3 per doz. net)
Mitre .....Net
Try .....Net
Try and Bevel.....Net
Try and Mitre.....Net
Fox's .....per doz. $6 00
Winterbottom's 10%

STOPPERS, FLUE

Common .....per doz. $1 10
Gem, No. 1.....per doz. 1 10
Gem, flat, No. 3....per doz. 1 00

VENTILATORS

Standard .....30 to 40%

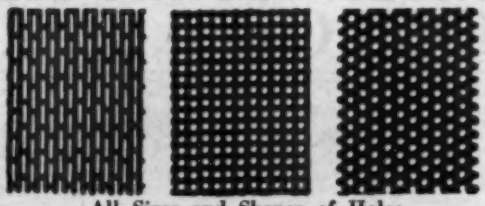
WIRE

Plain annealed wire, No. 8 per 100 lbs. $3 05
Galvanized barb wire, per 100 lbs. 3 90
Wire Cloth—black painted, 12-mesh, per 100 sq. ft.... 1 85
Cattle Wire—galvanized catch weight spool, per 100 lbs.. 3 80
Galvanized Hog Wire, 80 rod spool, per spool 3 15
Galvanized Plain Wire, No. 9, per 100 lbs. 3 85
Stove Pipe, per stone..... 1 10

WRINGERS

No. 790, Guarantee	...each	$5 10
No. 770, Bicycle	.....each	4 70
No. 670, Domestic	....each	4 35
No. 110, Brighton	....each	3 70
No. 750, Guarantee	...each	5 10
No. 740, Bicycle	.....each	4 70
No. 22, Pioneer.	.....each	3 40
No. 2, Superb	.....each	2 65

PERFORATED METALS



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EVERYTHING IN PERFORATING METAL

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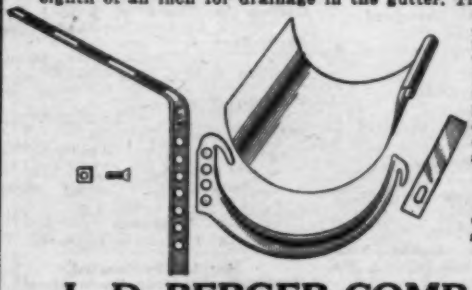
ROOF GUTTER SUPPORTS

This illustration shows, unassembled, one of the many styles of eaves trough hangers made by us which may be adjusted every eighth of an inch for drainage in the gutter. These hangers are widely used throughout the United States. Write for catalog No. 27 which also illustrates and describes conductor hooks and fasteners.



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CHICAGO

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Rotable Ventilator
Now made of Armco Iron

Patents pending

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The weight of the ventilator body is now carried on a concave thrust bearing nested in the apex of the conical body. This bearing turns upon the pivot point of the stationary center spindle.

The bronze Guide Bushings are now made of non-corrosive bronze which minimizes friction and any tendency to screech when body is rotating.

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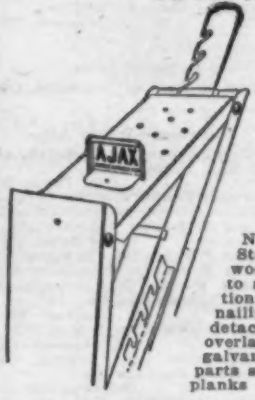
After Our Extension Ladders, Come Our— Ladder Jacks AND Roof Brackets!

The Safety Ladder Jack made of heavy steel, has four point suspension on the side rails, which is the strongest part of the ladder. Folds into a small space for carrying or storage and is easy to swing into position.

Per Pair $3.50



No. 2 Ajax Roof Brackets with Plank Stop for slate, tile, asphalt, metal and wood shingle roofs. Instantly adjusted to any pitch roof and locked into position. Attached to sheathing boards by nailing notched removable nail strip and detached by unhooking from beneath the overlaid course of roofing. Made of heavy galvanized metal, all die cut stamped parts securely riveted together. Boards or planks up to 12 inches wide can be used.

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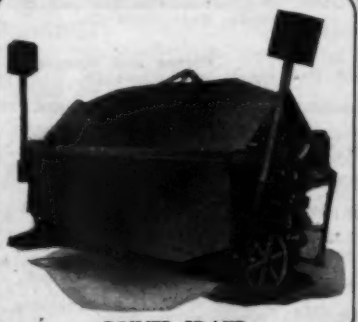
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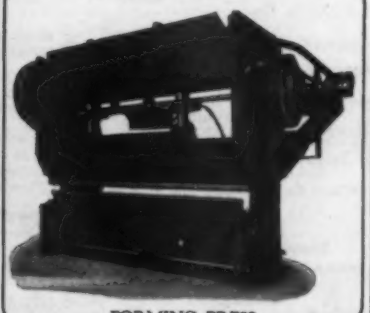
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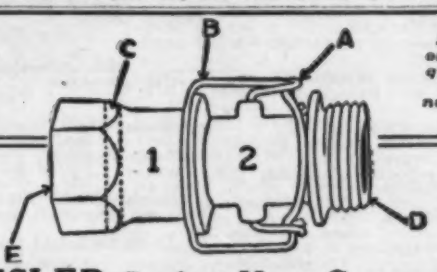

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Thatcher Co., Newark, N. J.

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Quick Meal Stove Co., St. Louis, Mo.

Register Shields.
Beh & Co., Inc., New York, N. Y.

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Forest City-Walworth Run Foundries Co., Cleveland, O.
Hart & Cooley Co., New Britain, Conn.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Independent Register & Mfg. Co., Cleveland, Ohio
Lamneck & Co., W. E., Columbus, Ohio
Meyer & Bro. Co., F., Peoria, Ill.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Mueller Furnace Co., L. J., Milwaukee, Wis.
Standard Furnace & Supply Co., Omaha, Neb.
Tuttle & Bailey Mfg. Co., Chicago, Ill.
United States Register Co., Battle Creek, Mich.

Registers—Wood.
American Wood Register Co., Plymouth, Ind.
Auer Register Co., Cleveland, Ohio
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
L. J. Mueller Furnace Co., Milwaukee, Wis.
United States Register Co., Battle Creek, Mich.

Repairs—Stove and Furnace.
Hessler Co., H. E., Syracuse, N. Y.
Kramer Bros. Fdy. Co., Dayton, Ohio
Northwestern Stove Repair Co., Chicago, Ill.

Ridging.
Armco Distributors Ass'n of America, Middletown, Ohio
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Rivets—Stove.
The Kirk-Latty Co., Cleveland, Ohio
Lamson & Sessions Co., Cleveland, Ohio
Ryerson & Son, Inc., Jos. T., Chicago, Ill.

Rods—Stove.
The Kirk-Latty Co., Cleveland, Ohio
Lamson & Sessions Co., Cleveland, Ohio

Rolls—Forming.
Bertsch & Co., Cambridge City, Ind.

Roofing Cement.
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Pecora Paint Co., Philadelphia, Pa.

Roof—Flashing.
Hessler Co., H. E., Syracuse, N. Y.
Milwaukee Corrugating Co., Milwaukee, Wis.

Roofing—Iron and Steel.
Armco Distributors Ass'n of America, Middletown, Ohio
Burton Co., The W. J., Detroit, Mich.
Friedley-Voshardt Co., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
Wheeling Corrugating Co., Wheeling, W. Va.

Roofing—Tin.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Taylor Co., N. & G., Philadelphia, Pa.
Wheeling Corrugating Co., Wheeling, W. Va.

Roofing—Zinc.
New Jersey Zinc Sales Co., The, New York, N. Y.

Rubbish Burners.
Hart & Cooley Co., New Britain, Conn.

Sal-Ammoniac.
Special Chemicals Co., Waukegan, Ill.

Schools—Sheet Metal Pattern Drafting.
St. Louis Technical Institute, St. Louis, Mo.

Schools—Warm Air Heating.
National Heatcraft Institute, Peoria, Ill.
St. Louis Technical Institute, St. Louis, Mo.

Screws—Hardened Metallic Drive.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Parker-Kalon Corp., 354 West 13th St., New York

Screws—Hardened Self-Tapping, Sheet Metal.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Parker-Kalon Corp., 200 Varick St., New York

Screens—Perforated Metal.
Harrington & King Perforating Co., Chicago, Ill.

Shears—Hand and Power.
Marshalltown Mfg. Co., Marshalltown, Iowa
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
Unishear Co., Inc., New York, N. Y.
Viking Shear Co., Erie, Pa.

Sheet Metal Screws—Hardened, Self-Tapping.
Parker-Kalon Corp., 200 Varick St., New York

Sheets—Black and Galvanized.
Armco Distributors Ass'n of America, Middletown, Ohio
Burton Co., The W. J., Detroit, Mich.
Inland Steel Co., Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
Taylor Co., N. & G., Philadelphia, Pa.
Wheeling Corrugating Co., Wheeling, W. Va.

Sheets—Iron.
Armco Distributors Ass'n of America, Middletown, Ohio
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Ryerson & Son, Inc., Jos. T., Chicago, Ill.

Sheets—Tin.
Merchant & Evans Co., Philadelphia, Pa.
Taylor Co., N. & G., Philadelphia, Pa.

Sheets—Zinc.
New Jersey Zinc Sales Co., The, New York, N. Y.

Shingles and Tiles—Metal.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Wheeling Corrugating Co., Wheeling, W. Va.

Shingles—Zinc.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Sifters—Ash.
Diener Mfg. Co., G. W., Chicago, Ill.

Sky Lights.
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Snips.
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.

Solder.
Chicago Solder Co., Chicago, Ill.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Soldering Furnaces.
Burgess Soldering Furnace Co., Columbus, Ohio
Diener Mfg. Co., G. W., Chicago, Ill.
Quick Meal Stove Co., St. Louis, Mo.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.

Soldering Supplies.
Special Chemicals Co., Waukegan, Ill.

Specialties—Hardware.
Diener Mfg. Co., G. W., Chicago, Ill.
Hessler Co., H. E., Syracuse, N. Y.

Stars—Hard Iron Cleaning.
Fanner Mfg. Co., Cleveland, Ohio

Statuary.
Friedley-Voshardt Co., Chicago, Ill.
Gerock Bros. Mfg. Co., St. Louis, Mo.

Stove Pipe Reducers.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

Stoves—Camp.
Quick Meal Stove Co., St. Louis, Mo.

Stoves—Gasoline and Oil.
Quick Meal Stove Co., St. Louis, Mo.

Stoves and Ranges.
Quick Meal Stove Co., St. Louis, Mo.
Thatcher Co., Newark, N. J.

Tacks, Staples, Spikes.
American Steel & Wire Co., Chicago, Ill.

Tinplate.
Burton Co., The W. J., Detroit, Mich.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Taylor Co., N. & G., Philadelphia, Pa.

Tools—Tinsmith's.
Bertsch & Co., Cambridge City, Ind.
Burton Co., The W. J., Detroit, Mich.
Dries & Krump Mfg. Co., Chicago, Ill.
Hyro Mfg. Co., New York, N. Y.
Marshalltown Mfg. Co., Marshalltown, Iowa
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chicago, Ill.
Viking Shear Co., Erie, Pa.
Whitney Mfg. Co., W. A., Rockford, Ill.
Whitney Metal Tool Co., Rockford, Ill.

Torches.
Burgess Soldering Furnace Co., Columbus, Ohio
Diener Mfg. Co., G. W., Chicago, Ill.
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Sheet Steel Trade Extension Committee, Pittsburgh, Pa.

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Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
Standard Ventilator Co., Lewisburg, Pa.

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Hart & Cooley Co., New Britain, Conn.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Tuttle & Bailey Mfg. Co., New York

Windows—Steel.
Lupton's Sons Co., David, Philadelphia, Pa.

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Zinc.
Merchant & Evans Co., Philadelphia, Pa.
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WANTS AND SALES

Yearly subscribers to the AMERICAN ARTISAN may insert advertisements of not more than fifty words in our Want and Sales Columns WITHOUT CHARGE.

Such advertisements, however, must be limited to help or situation wanted, tools or equipment for sale, to exchange or to buy, business for sale or location desired and must reach our office by Thursday of the week of publication. This privilege is not extended to manufacturers or jobbers—or those making a business of buying and selling used machines, employment agencies and brokers.

When sending advertisement state whether your name or blind number is to be used.

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Lightning Rods—Dealers who are selling Lightning Protection will make money by writing to us for our latest Factory to Dealer Prices. We employ no salesmen and save you all overhead charges. Our Pure Copper Cable and Fixtures are endorsed by the National Board of Fire Underwriters and hundreds of dealers. Write today for samples and prices. L. K. Diddie Company, Marshfield, Wisc.

A well established and good paying all around sheet metal and heating and ventilating business for sale, in part or whole. Well equipped for inside and outside work. Two cornice brakes and all necessary tools and machines. Will sell or rent shop. Property located in the heart of the best little city in Wisconsin. A real opportunity for a live young mechanic and business man. Reason for selling—too old to continue and have other business to look after. Address F-467, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago.

For Sale—Sheet metal and radiator shop in Florida town, county seat, 3,500 population, 50 miles from Tampa. Plenty of tools and work is improving. Inventories at $12,000.00. $500.00 down and balance to suit or $1,000.00 cash. Rent, $15.00 month. No competition. Ideal living conditions. Nice house for rent at $15.00. Address Box 372, Dade City, Fla. Z-467

For Sale—Plumbing and heating establishment in town near Detroit, Mich. Fine store, good stock and tools. Reasonable rent and long lease. Inventory, $10,000. Profits for 1927, $7,000. Reason for selling—other business. Good land contract considered as part payment. Address G-467, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

For Sale—Best sheet metal and ventilating shop in midwestern city of 200,000. Shop does from $100,000.00 to $150,000.00 business per year. For past eight years has made a profit of 33⅓ to 50% on Capital Stock. Established for over 25 years and enjoys the confidence of the entire community. Best reasons for selling. Address T-467, AMERICAN ARTISAN, 620 S. Michigan Avenue, Chicago, Ill.

For Sale—Good established sheet metal shop in city of 35,000 population. Full line of tools in good shape, truck, cheap overhead. Change of climate reason for selling. $800.00 will buy this business if sold at once. Address W-467, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

BUSINESS CHANCES

Wanted—A heating and ventilating and general sheet metal man who has $2,500.00 or more to buy a working interest in a growing concern which is doing a yearly business of approximately $50,000.00 which can be increased to $75,000.00 or $100,000.00 by connecting up with a capable man who is capable of handling men and estimate plans and act as general shop superintendent, located in a city in southern Michigan. A young or middle aged man preferred, who is energetic and takes a personal interest in the business. For further particulars write C-468, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

For Sale—Sheet metal shop in a very good location. Have complete line of Niagara machines and tools, good stock, one ton truck. Shop 22x32 with large stock room on second floor. Rent very reasonable. Will sell at a big reduction for a quick sale. This is an opportunity for a man to step into a shop and start right in without added expense. Address A-468, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

For Sale—Sheet Metal and Furnace Business in northern Ohio city. Doing very good business and have first class equipment and clean stock. One 6-room all modern residence. Priced right. Address H-467, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago.

For Sale—Nice clean stock of hardware in one of the best county seat towns in North Central Kansas. This town has a population of about 5,000 with only one other hardware store. Address X-467, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

For Sale — Sheet metal shop. Fully equipped. 7 years in business, 5 men working. Must sell on account of health. Write for particulars. Address A. Kaufman, 2146 Larimer Street, Denver, Colo. L-468

For Sale—Sheet metal and furnace shop in county seat town of 3,500 population in Northeastern Iowa. Good set of tools and good business. Shop 25x40. Address H-466, AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois.

Good 80 acres of land in Haakon County, South Dakota, for exchange of hardware stock or shop equipment. Address B-468, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

Wanted—Small stock of hardware with tin shop in small city or town. Wisconsin, Minnesota or Iowa preferred. Address E-466, AMERICAN ARTISAN, 620 South Michigan Ave., Chicago, Illinois.

For Sale—Complete sheet metal shop equipment. List of items and prices furnished upon request. Address Horel-George Co., Eau Claire, Wis. E-467.

SITUATION WANTED

Situation Wanted—By first class sheet metal worker, 25 years' experience. Can read blue prints and cut patterns for all kinds of sheet metal work. Expert furnace installer. Can take charge of shop, and handle men and work for employer's interest. Married. Address Wm. F. Laudenschlager, 2106 Indiana Ave., Columbus, Ohio. S-468

Position wanted by sheet metal worker and furnace man; 20 years at trade, neat and capable of high class workmanship. Married, good habits, steady and dependable. Open for engagement at once. Iowa preferred. Address J-467, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

Wanted—Permanent position by practical plumber and sheet metal worker. A real mechanic and production man carrying journeyman's license. Address K-467, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

Situation Wanted — By experienced stove and furnace salesman acquainted with Michigan hardware trade. Address S-467, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

SITUATION WANTED

Situation Wanted—A first class a-number-one sheet metal mechanic with long and wide experience in every class of work including laying out any pattern, wants steady position. Long experience as foreman, superintendent and engineer. Married, sober, steady and a hustler. Age 47 years. State particulars and pay. Address P-467, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

Position Wanted—By man of good habits. 20 years' experience in sheet metal work and furnace and installation. Can go at once. Last employed by the Lennox Furnace Company. Want to locate in New York, Penna., Ohio or Indiana. Best of references. If interested in a steady and good workman please write at once. Address Henry Giberson, Elk Point, S. D. Y-468

Position Wanted—By first class sheet metal and copper worker. Minnesota or California preferred. Will consider other locations. Experienced in ventilation, skylight, gutter and furnace work. Married and with present firm 8 years. State wages and work. Can come at once. Address A-469, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

Position Wanted—By first class sheet metal worker and furnace man. 16 years' experience. Can work from blueprints, lay out own work, do Standard Code installation and do heating and ventilating engineering. Experienced on factory maintainence and blow pipe work. Can come at once. Address Box 325, Rochester, New York. B-469

Position Wanted—By first class furnace installer capable of taking charge of shop and handling men. First class pattern cutter and can work from blue prints. Have had 25 years' experience, married and want a steady job at reasonable living wages. Can come at once. Address Bert Hawkins, Dexter, Michigan. T-466

Position Wanted—By a practical experienced all around tinner. 30 years' experience. Prefer general all around jobbing shop. Can take charge and run shop. Can do all kinds of roofing and heating and ventilating. Small town preferred. Can come at once. Address P. S. McGriffin, Inkster, Mich. Z-468

Situation Wanted—Plumbing and heating engineer capable of figuring heating systems, hot water, steam, vapor and warm air and make his own drawings. Close up sales. Twenty years' experience. Address O-467, care of AMERICAN ARTISAN, 620 So. Michigan Ave., Chicago, Ill.

Situation Wanted—By an all around combination man. Have an Iowa State plumbing license. Can do steam fitting and hot air furnace work. Good at pumps and wind mills. Can do some tinning. Address W-468, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

An A-1 sheet metal worker and estimator and layout man, middle aged, wants steady job. Experienced in cornice, skylight, heating and ventilating, blow pipe. Please state working conditions. Address Dan Coleman, 1524½ Broadway, Mattoon, Illinois. X-468

Wanted—Position as tinner and plumber. I have had 30 years' experience. Steady, good habits, A-Number 1 on Hot Air furnace work. Can come at once. Married and have a family. Address L-467, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago.

Situation Wanted—Competent combination tinner and plumber wants work. 12 years' experience. Can and will do anything. Married; 35 years old. Can come at once. State wages in first letter. Address R-467, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

Situation Wanted—By an all-around handy man—plumbing, steamfitting, tin work, house electric wiring, guttering. Finest work and can also help in a hardware store. 14 years' experience. Address A-465, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Ill.

Situation Wanted—By metal worker and furnace man. 15 years at the trade. Married, sober and want a steady job. Address W. E. Hull, 409 Military, Dodge City, Iowa. T-468

TINNERS' TOOLS

For Sale—1 only—New Rapid Sliting Shear 15-inch throat, 1 angle iron Rolls or formers, back geared, 1 seaming head stake and heads (also some extra large heads); 1 30-inch mandrel; 1 extra long tapered bench mandrel; 1 30-inch groover; 1 20-inch folder; 2 raising hammers; 2 slating and other hand tools. Write at once for price. I. B. Allen, care Gen. Delivery, Ft. Wayne, Ind. P-468

For Sale—1 large pair roofing tongs, 1 pair large gutter tongs, 1 4 ft. steel straight edge, 1 set slater's tools, ripper, stake and hammer. These tools are practically new and can be bought for $15.00. Address K-466, AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois.

For Sale—Biglows pat. 30 inch grooving machine for furnace and stove pipe flattens seam on return and releases mandrel so pipe can be removed. Good as new Cost $60.00, will sell for $35.00 F. O. B. Sedalia, Missouri. Address The Sedalia Sheet Metal Works, 114 West Second Street, Sedalia, Missouri. L-466

For Sale—An Oster Threader with ratchet and cutoff knife. Cuts threads 2½ inch, 3 inch, 3½ inch, and 4 inch. Has cut less than 100 threads. In perfect working order. Cost $32.50 wholesale—$15.00 takes it. Aberdeen Furnace Company, Box 983, Aberdeen, So. Dak. R-468

For Sale—1 No. 2 Niagara groover 36 inch. This machine has been used very little and can be bought very reasonable. Make me an offer. Also have 1 30 inch pipe folder that I do not need. Address S. E. Ethridge, 1103 Denison St., Little Rock, Ark. E-468

What do you want in bench or hand tools? Write to I. B. Allen, care Gen. Delivery, Ft. Wayne, Ind. M-468

Wanted—To buy complete set of tinners tools. Address Billart & Ress, Oakland City, Ind. O-468

HELP WANTED

Wanted—First class sheet metal worker under 40 to take charge of shop. Small manufacturing concern in central Wisconsin. Must be steady and a fast worker. Can invest capital if desired. Address R-465, AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago.

Wanted — An industrious go-getter. Must have experience in plumbing and tinners trade. Must be honest, reliable and sober and able to manage one of our shops. Address Illinois Plumbing and Heating Co., Du Quoin, Illinois. M-466

MISCELLANEOUS

For Sale—One No. 66 gallon Humphry Automatic Storage Water Heater, $310 value for $150, suitable for 3 apt. building or large home. Can be seen at North Avenue Sheet Metal Works, 1714 West North Ave., Chicago. D-467

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For Sale Cheap—1 Abner Pit Generator (Acetylene) for farm lighting. Brand new, never uncrated. Also a few lighting fixtures. Will sell cheap. W. B. Jordan & Son, Lynchburg, Va. F-468

For Sale—One new Laco Automatic Oil Gas Burner complete with Thermostat, a bargain if taken at once. Address J-468, AMERICAN ARTISAN, 620 S. Michigan Ave., Chicago, Illinois.

Would like to get in communication with G. C. Marion, Sheet Metal Worker. Address Griffith & Griffith, P. O. Box 194, Charleston, W. Va. K-468

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SITUATION WANTED

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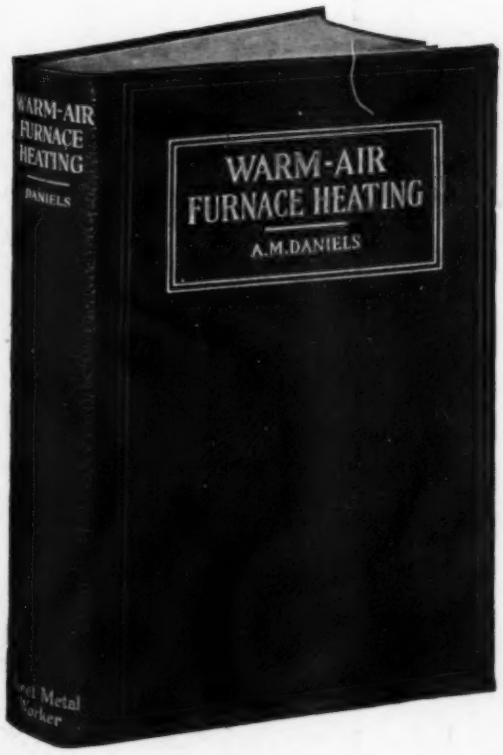

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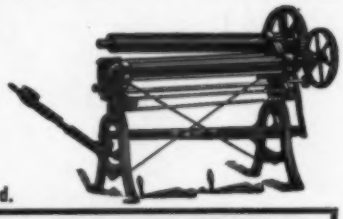

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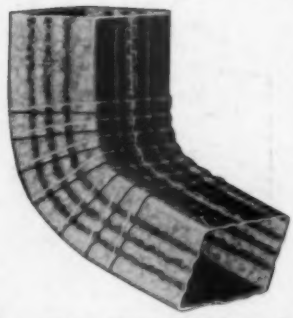

Milcor ONEPIECE Conductor Pipe Elbows

Plain Round—Corrugated Round—Corrugated Square — Galvanized after formation

Kuehn's Korrekt Kutoffs

Plain Round—Corrugated Round—Corrugated Square — Galvanized after formation

Conductor Pipe Funnels

Corrugated Round Plain Round

Milcor Ends and Drops

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All Milcor Products now available in Steel, "Coppered Metal", Zinc, Anaconda Copper or rust-resisting

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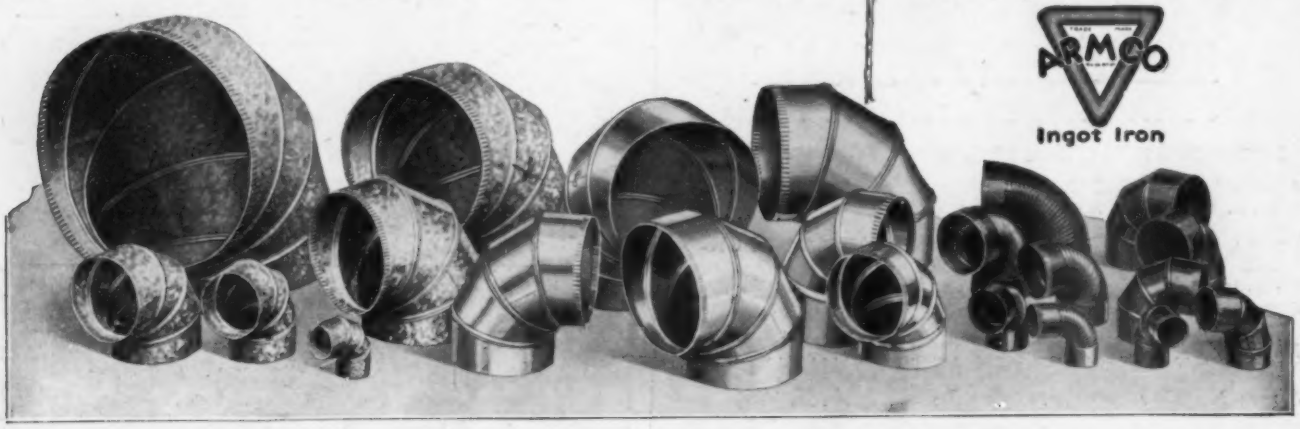
Ingot Iron